APRIL, 1957

TRAFFIC ENGINEERING

- A Turn to the Left
- Some Aspects of Freeway Design and Operation
- Predicting the Registration of Petroleum-Fueled Motor Vehicles
- Civil Service Requirements for Traffic Engineering Positions

INSTITUTE OF TRAFFIC ENGINEERS
ITE
FOUNDED 1930

DUNCAN METERS

TWO HOUR TIME LIMIT
TIME EXPIRED
INSTRUCTIONS
INSERT COIN IN CORRECT SLOT
TURN HANDLE AS FAR AS POSSIBLE AFTER EACH COIN

The

"SOLID GOLD" METER

Distinctively outstanding in appearance . . . . .
"Good as Gold" in quality . . . . .

We invite your inquiry for the "Inside Story" of DUNCAN-MILLER's rugged dependability and overwhelming acceptance by municipal officials and servicemen everywhere.

Write Today

DUNCAN PARKING METER CORP.
835 NORTH WOOD STREET • CHICAGO 22, ILLINOIS
FACTORIES: HARRISON, ARKANSAS AND MONTREAL, P.Q., CANADA
Manufacturers of fully automatic and manual parking meters.

...wasting maintenance dollars

...use rustproof signs made of Kaiser Aluminum

Longer Lasting—Unlike signs of steel or wood, signs made of Kaiser Aluminum never rust, rot or warp. They stay rust free—even if punctured by vandalism or accidents.

Brighter, Safer—Aluminum signs make an excellent base for paint and are also ideal for use with reflective sheeting. There's no rusting to destroy readability.

Easy-To-Handle—Although they are strong enough to resist winds over 100 miles per hour, signs made of Kaiser Aluminum are so light in weight that they save on shipping, erection and handling costs.

The most popular sizes and shapes are stocked by Kaiser Aluminum distributors throughout the country. Call your Kaiser Aluminum distributor or the Kaiser Aluminum sales office listed in your telephone directory under "Aluminum." Kaiser Aluminum & Chemical Sales, Inc., *General Sales Office*, Palmolive Bldg., Chicago 11, Illinois; *Executive Office*, Kaiser Bldg., Oakland 12, California.

Send for your copy of "The Sign of Modern Times"—containing full availabilities and advantages of Kaiser Aluminum extruded crossbucks and sign blanks. Write: Industrial Service Division, Room 7740, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California.

Kaiser Aluminum

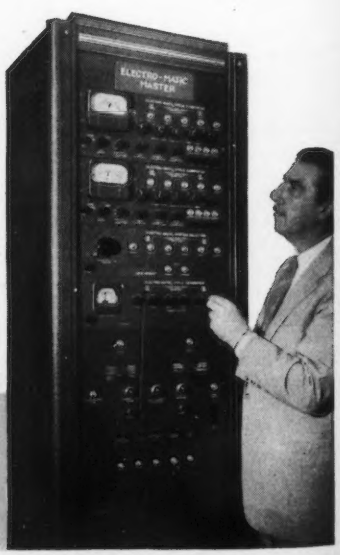
See the "KAISER ALUMINUM HOUR" Alternate Tuesdays NBC Network. Consult your local TV listing.

"PR" COORDINATED TRAFFIC SIGNAL SYSTEM

- Utilizes all of the traffic analyzing abilities of the Electro-Matic Master as well as the all-new, all-electronic PR local controllers.
- The Master selects cycles and offsets best suited to prevailing traffic conditions and feeds this information to the PR's at each intersection.
- *The PR Controllers are first to embody all of the following features:*

- **Completely electronic**
- **Controls downtown grids or arteries**
- **Six cycle lengths—4 offsets—3 cycle splits—all determined by traffic volume and direction**
- **Offsets shifted smoothly by increasing or decreasing green intervals — eliminating long dwell periods**
- **Simple dial settings for Offsets and Cycle Splits**
- **Green intervals are traffic-adjusted while clearance and special intervals are constant at each intersection**
- **Maintenance-minded design includes printed timing circuit and accessible chassis construction**

For details, write for Bulletin E-224



TRAFFIC ACTUATED

AUTOMATIC SIGNAL DIVISION

Eastern Industries, Inc.

NORWALK • CONNECTICUT

TRAFFIC ENGINEERING

OFFICIAL PUBLICATION OF THE INSTITUTE OF TRAFFIC ENGINEERS

Vol. 27 APRIL, 1957 Number 7

INSTITUTE OFFICERS

J. CARL McMONAGLE
President

JOSEPH E. HAVENNER
Vice-President

MATTHEW C. SIELSKI
Vice-President

EDWARD G. WETZEL
Secretary-Treasurer

DIRECTORS

ROBERT A. BURCH
District Number 5

GEORGE J. FISHER
District Number 4

GORDON K. GRAVELLE
District Number 2

HERBERT C. HIGGINS
District Number 6

GEORGE W. HOWIE
District Number 3

FRED W. HURD
District Number 1

CHARLES W. PRISK
Immediate Past President

PUBLICATION STAFF

DAVID M. BALDWIN
Editor

G. A. BACCHUS
J. W. CHAMBLISS
C. C. CLARK
WM. E. CORGILL
R. E. DUNN
M. J. HUBER
WM. L. MARVIN
E. A. MUELLER
C. C. ROBINSON
S. T. SIEGEL
BURT WHEDON
Associate Editors

CONTENTS

FEATURES

A Turn to the Left 313
Walter E. Schwanhausser, Jr.
Some Aspects of Freeway Design and Operation 318
Terry J. Owens
Predicting the Registration of Petroleum-Fueled Motor Vehicles .. 320
Alton Keith Gilbert
Civil Service Requirements for Traffic Engineering Positions 322

NEWS

Coming Events 321
Traffic News 331
New Appointments 332
Positions Available 333
Strictly Business 334
New Publications 336

INSTITUTE AFFAIRS

Section News 338
Yearbook Changes 340
Membership Applications 340
Secretary's Page 346

MISCELLANEOUS

Reference Notes 344
Professional Service Directory ..... 344 & 345
Index to Advertisers 344

COVER: Palos Verdes Drive near Point Vincente Lighthouse, Los Angeles area, California. Note use of two one-way roadways at different elevations to take advantage of the terrain. Also note use of double line to prohibit passing on left shoulder.

TRAFFIC ENGINEERING is published monthly by the Institute of Traffic Engineers. Editorial offices are at 2029 K Street NW, Washington 6, D.C. Advertising plates should be sent to Interstate Printing Corp., 400 Watchung Avenue, Plainfield, N. J. For advertising information other than California, address Traffic Engineering, P. O. Box 1015, Plainfield, N. J. For California information, address Jess M. Laughlin Co., 3757 Wilshire Blvd., Los Angeles 5, Calif.

Entered as second-class matter November 7, 1941, at the Post Office at Plainfield, New Jersey, under Act of March 3, 1879. ¶Single copies 40 cents, subscription price $3.50 per year in the United States; $4.75 per year to foreign countries.

The Institute is not responsible for any statements made or opinions expressed in its publications. Publication of advertising does not constitute Institute approval or endorsement of the products or services advertised. Permission to reprint contents with customary credit line is given unless otherwise stated.

ROBBINS
superior
TRAFFIC CONES

IT'S HERE!

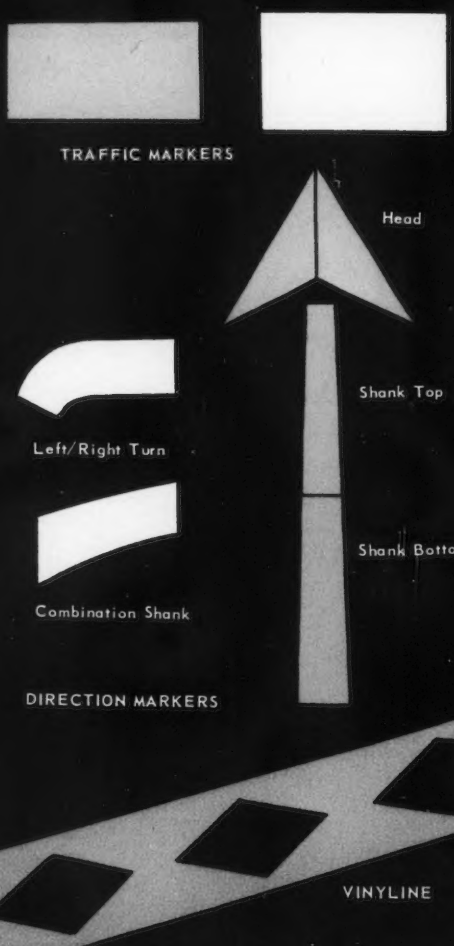
There has definitely been a great need for a superior traffic cone. Robbins has now met this need with the most revolutionary Cone on the market.

Incorporated into this Cone is every qualification for making it the leader in its field. The best ideas of traffic men and Engineers everywhere have been adapted into this revolutionary new Cone.

- MADE OF ALL NEW NON-OXIDIZING SYNTHETIC RUBBER
- CORRECT HEIGHT AND BASE SIZE
- PERMANENT COLOR – COLORS ARE COMPOUNDED INTO RUBBER, NEVER NEED PAINTING
- WILL NOT TEAR OR BREAK (tested extensively under actual conditions)
- GUARANTEED FOR 5 YEARS

You can depend on Robbins Traffic Markers for safety, economy and permanence.

For complete information, write, wire or phone our factory... today!



ROBBINS TIRE & RUBBER CO., INC.

Tuscumbia, Alabama

Frankly Speaking . . .

PENDING LEGISLATION, both nationally and at local levels, has focused attention in recent weeks on the question of roadside advertising or billboards. Proponents as well as opponents of outdoor advertising have attempted to identify a relationship between accidents and bilboards, and the traffic engineer has been asked to take sides—on the basis of the safety aspects of the problem.

Fortunately most traffic engineers have been able to stay out of the argument. Facts are notably few and far between, but those that do exist indicate no significant relationship between outdoor advertising and the occurrence of traffic accidents. This conclusion was reported in a Michigan Highway Department study some years ago, and has been widely quoted by engineers who express an opinion on the subject.

No one denies that a billboard located at an intersection or a curve so as to obstruct the view, or a sign which confuses a driver by its message, color or illumination is a hazard. On the other hand, there are no facts which show any hazard resulting from advertising signs in general. Attempts by opponents of outdoor advertising to assume such a relationship are unfair and are not condoned by engineers, who will insist on seeing evidence of any such relationship.

This does not mean that traffic engineers favor outdoor advertising. Undoubtedly some do—but certainly many do not. Their reasons for opposing billboards, if this is their position, are those of aesthetics or personal opinion, however, not because there are facts about accidents.

It is unfortunate that the billboard arguments have been identified in so many minds as ones which can be resolved on the basis of traffic safety. In effect, the opponents of billboards have tied their case to the coat-tails of safety. This misleading identification has been confusing to the general public, which is not aware of the facts of the case.

Let's take every opportunity to explain the situation. Let's spike the attempts to blame accidents on billboards and to promote anti-billboard legislation *on the basis of its effect on safety*. Let's be for or against billboards as we will—but let's admit that it is on the basis of our own likes and dislikes, our own opinions and interests. As engineers who preach a factual approach to all our problems we can adopt no other attitude toward this one.

DAVID M. BALDWIN,
Executive Secretary
Institute of Traffic Engineers

NOW! SAVE TIME • MONEY • LABOR

with new

FLEX-O-LITE

FREE FLOWING GLASS BEADS

FLEX-O-LITE INTRODUCES NEW FREE FLOWING REFLECTIVE GLASS BEADS

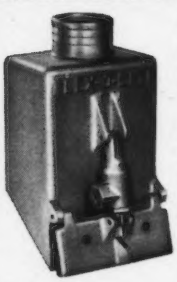
Flex-O-Lite Manufacturing Corporation, St. Louis, producer of reflective glass beads for highway markers and signs, has been granted a patent incorporating seven claims for the manufacture of its new free flowing glass beads, it was announced today by

New highs in humidity resistance, workability, ease of application, brilliance and reflectivity are available in new Free Flowing Glass Beads by Flex-O-Lite... finest achievement of the reflective glass bead manufacturer's art.

The result of five years of research and development, they were fully tested for 24 months with the cooperation of highway and traffic engineers. Already they are in use in several states and in many cities throughout the country. A trial order will convince you. Write us today for details and free Specifications Booklet.

LOOK AT THESE OUTSTANDING FEATURES:

1. Marked resistance to high humidity
2. Flow freely through dispensing equipment
3. Store for unlimited periods without agglomerating
4. Contain no injurious waxes, oils, resins or silicones
5. Offer perfect adhesion to any suitable traffic bead binder



New Flex-O-Lite Positive Free Flowing Bead Dispenser

Economical answer to the problem of reflective glass bead application. Works equally well with Standard Type A, "Free-Flow" or Moisture-Resistant Type C beads. Available in 4, 5, & 6" widths. Completely automatic or may be manually operated. Send for folder.

FLEX-O-LITE MANUFACTURING CORP.

FLEX-O-LITE

Post Office Box 3066 (Affton Branch) • St. Louis 23, Mo.

A Turn to the Left

By Walter E. Schwanhausser, Jr.
(Assoc. Mem., ITE)
Senior Application Engineer
Outdoor Lighting Dept.,
General Electric Co.

ONE OF THE TWO most vexing problems in traffic control today is the left turn. Parking is probably the other. How simple and uninteresting life would be without these situations!

A simple solution to the left turn problem is to abolish all such movements! In a few cases, this can and has been done with considerable success. Usually under these conditions, the left turn is accomplished by making three right turns, or "taking a turn around the block." Such a solution frequently fails to prove practical for one or more reasons. For the purposes of this discussion, some of those solutions which will permit and expedite left turns at the intersection as well as the equipment required to execute the plan, will be discussed.

Channelization

Segregation of the left turning vehicles from the rest of the traffic is highly desirable. When the street width permits, this is best accomplished with channelization, or a cutout lane placed in the median or center dividing island as illustrated by Figure 1. With some of the larger (aprox. 15′ plus) medians, a solid barrier is constructed between the through and left-turn lanes. This barrier starts at the stop line and runs back towards the en-

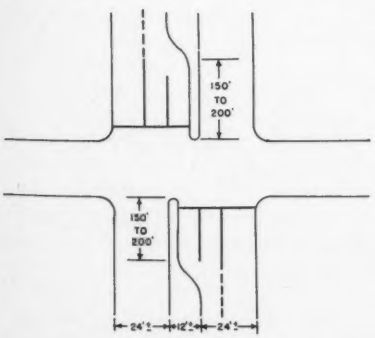


Figure 1

Figure 2

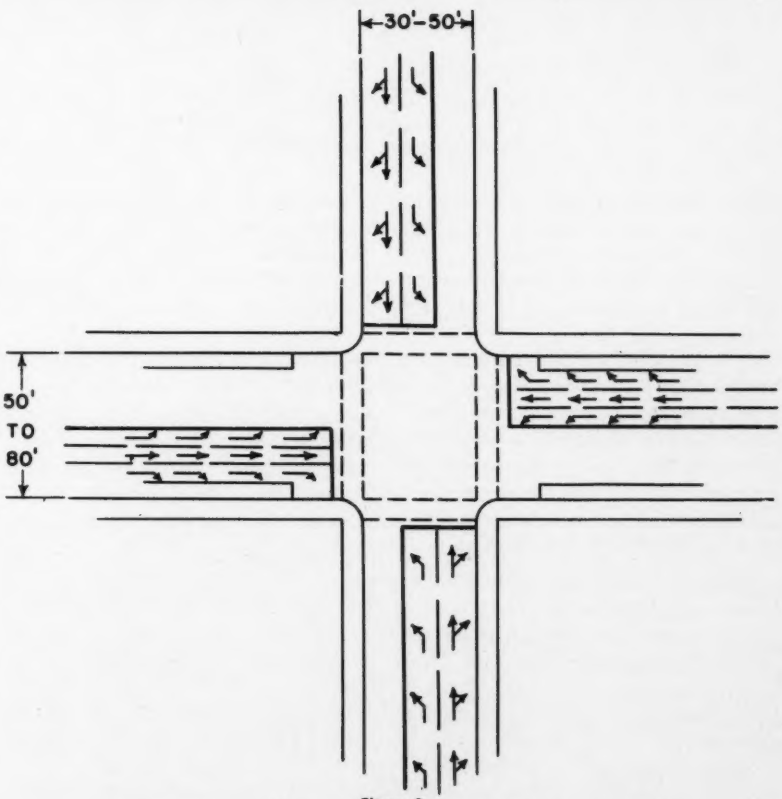


Figure 3
Pavement markings for segregating and expediting left turn movements.

INTERVAL NO.	INTERVAL SEC.	COLOR SEQUENCE MAIN ①	MAIN ③	CROSS ②
I	"X"	G	G	R
II	3-4	Y	Y	R
III	"X"	R	R	G
IV	3-4	R	R	Y
V	"P"	R	G	R

"X" PRE TIMED OR TRAFFIC VARIABLE TIMING
"P" PRE TIMED 0— 15 SEC.

TRAFFIC FLOW

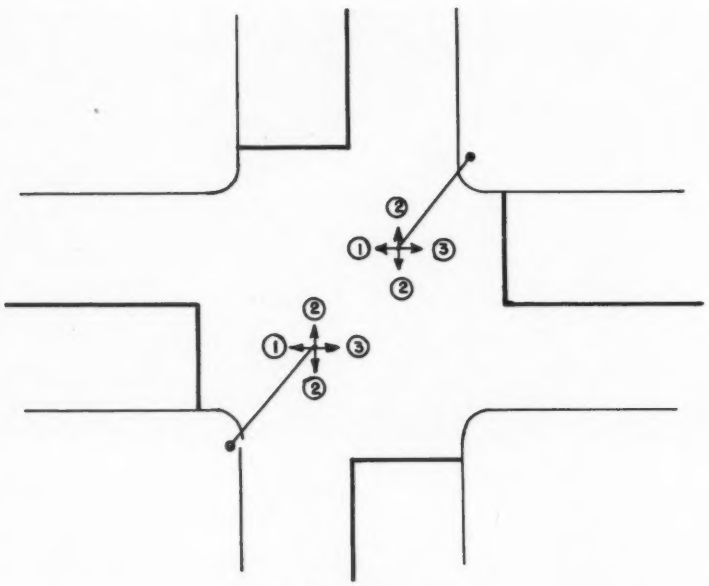


Figure 4
Advanced green (split phase) application.

trance to the cutout lane, as illustrated in the photograph shown as Figure 2. Such construction discourages last minute lane switching and reduces the sideswipe accident hazard. In any event, a cutout lane isolates the left turn vehicles and reduces the rear end accident hazard. In some cases, such as where turning movements are light, channelization alone will prove effective without the use of signalization or any other control measures.

Pavement Markings

If construction of the channelization island or dividing strip is impractical for some reason or other, it frequently can be "painted in." Figure 3 illustrates some pavement markings that are applicable to different situations as generally found in urban areas. A great amount of "channelization" and traffic control can be accomplished with a bucket of paint.

Whenever a left turn movement bebecomes a serious problem within an urban area, traffic signals are almost sure to be involved. When properly planned and applied, signals will prove most effective. More often than not, the better solution to left turn problems involve signals, combined with channelization and pavement markings.

Signalization Plans

There are numerous signalization plans that one might use. The degree of success obtained will depend upon the facts of the case. Both pre-timed and actuated controls may be used depending upon the predictability of the traffic flow. For the moment consider only the color sequences that might be used. Following are the main classifications:

1. Advanced green intervals.
2. Extended green intervals.
3. Separate left turn phase.

All three classifications have their advantages and drawbacks. All three have their modifications, designed to improve their drawbacks without sacrificing their advantages. The first two methods are, of course, applicable to situations where the left turn problem exists on only one approach of a traffic phase.

Advance Green (Split Phase) Interval

One of the most popular and frequently used methods of expediting left turns is commonly called the advance green or split phase interval. In this method, one approach of a traffic phase is provided with a green indication before the opposing direction. This scheme works out fairly well on relatively narrow streets and where it is difficult or impractical to segregate left-turning vehicles. The theory behind this phasing is that the advance green signal gives the left-turn movement "a jump" on the opposing traffic. A typical application is illustrated in Figure4.

The advance green interval proves to be quite satisfactory so long as the left turns are not too numerous and the opposing traffic does not "jump the light" or falsely anticipate their green signal. When traffic having the advance green indication starts to move, it may be found that the opposing traffic will also start to move, even though their signal is still red. This is an undesirable situation. Likewise, a heavy left-turn movement that fails to yield the right-of-way to oncoming traffic after the end of the advance green interval is objectionable. In such cases an extended green interval may prove to be a better solution to the problem.

It should also be mentioned that in some states the left hand turn, by law, must yield the right of way to oncoming traffic. Consequently, motorists might—and do—balk at taking advantage of the advance green indication, thus defeating its purpose.

Extended Green Sequence

With the extended green interval, the approach from which the left turns are to be made is provided with a longer or "extended green" signal. Both opposing approaches get the green light simultaneously but traffic opposing the left-turn movement is signaled to stop before the "left-turn" approach. With this plan, the left

turns are "stored" or are supposed to yield the right-of-way to the opposing traffic until a break in the traffic flow occurs. This break may only appear when the signals force such a break in the oncoming flow.

In many cases, especially where it is difficult to segregate the left turns from the other traffic, and where left-turning vehicles will yield the right-of-way to the opposing traffic, the extended green interval will help clear the intersection more effectively than the advance green signal. Again, motorists must be polite and willing to allow the opposing traffic to pass through the intersection before they attempt a left turn. If motorists desiring to turn left tend to force their movement and seriously interfere with the opposing traffic, other restrictive measures must be taken.

Restrictive Signal Indications

Where the street width permits the segregation of the left-turning vehicles and where the advanced or extended green signal intervals fail to achieve the desired results, restrictive signal indications obtained with the use of arrow lenses may prove to be an effective solution to the left-turn problem. Both the advanced and extended green sequences can be modified with the use of arrow signal lenses. The general theory is to prohibit left turns whenever they might cause a conflict with the oncoming flow of traffic.

In the modification of an advance green interval, a left-turn green arrow would be illuminated only during the advance green portion of the cycle. Likewise, in an extended green sequence, the left-turn arrow would be illuminated only during the latter part of the green interval. In effect, such intervals are no longer split phases but actually separate phases. To get motorists to turn left only when the arrow signal is displayed will require auxiliary signs stating in effect, "Turn Left on Arrow Only."

Another means of achieving the same results is to substitute through and right green arrows for the conventional green lens as in Figure 5. Still another method is to use lane signals as shown in Figures 6, 7, and 8. When using lane signals, it must be possible to suspend or mount separate indications for the left-turn lane as well as for through and right-turn lanes. Restricting left turns so that they cannot possibly interfere with the oncoming vehicles, eliminates the principal objections to both the advance green and extended green sequences.

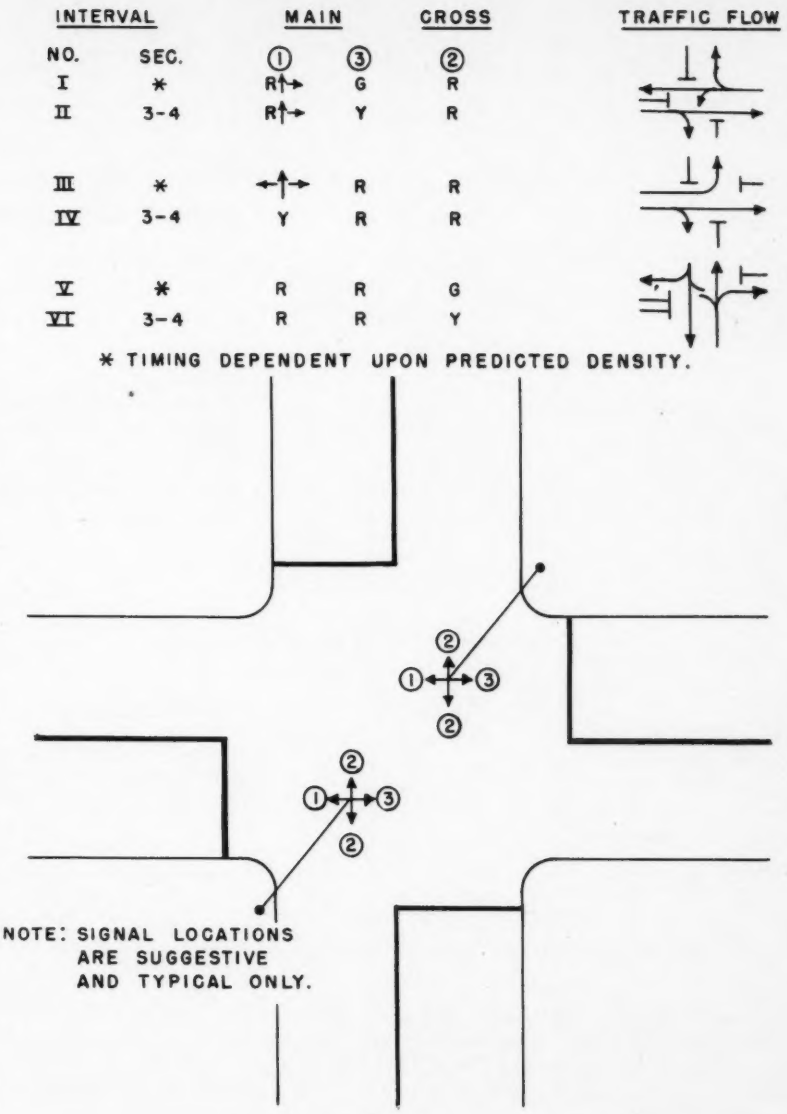


Figure 5
Separate left turn (extended phase) sequence.

The only drawback to the restricted signal indications occurs during periods of relatively light traffic when it might prove acceptable for the left turns to be made at times other than the advanced or extended green intervals. Consequently, one must analyze his problem rather accurately to determine if the advantages of the restrictive signal sequence will outweigh the disadvantages.

Attainment of Split Phase Color Sequences

The type of control equipment that will be required to attain any one of the desired color sequences will depend upon a number of factors. First consideration is the location of the signal heads and the precise signal indications to be provided. Secondly, the required mechanism will vary, depending upon whether the signal installation is of a pre-timed or vehicle-actuated control.

Pre-timed Signals

In the case of a pre-timed installation, two additional signal circuit cams and contacts will provide the advance green signal indications. Likewise, the advance green signal indications and their associated red signals must be segregated or wired separately from the opposing red and green signals.

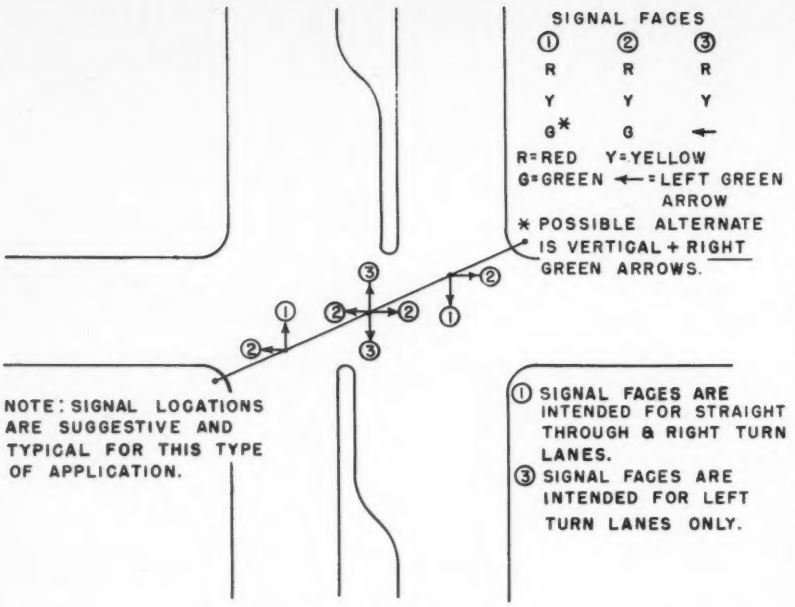
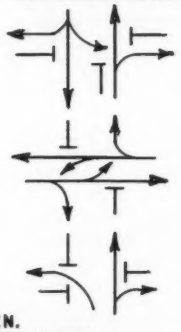

SIGNAL FACES
① ② ③
R R R
Y Y Y
G* G ←
R=RED Y=YELLOW
G=GREEN ←=LEFT GREEN ARROW
* POSSIBLE ALTERNATE IS VERTICAL + RIGHT GREEN ARROWS.
NOTE: SIGNAL LOCATIONS ARE SUGGESTIVE AND TYPICAL FOR THIS TYPE OF APPLICATION.
① SIGNAL FACES ARE INTENDED FOR STRAIGHT THROUGH & RIGHT TURN LANES.
③ SIGNAL FACES ARE INTENDED FOR LEFT TURN LANES ONLY.

Figure 6
Illustration of overhead lane signals.

PHASE	INTERVAL NO.	INTERVAL SEC.	COLOR SEQUENCE MAIN ST. ①	MAIN ST. ③	CROSS ST. ②
A	I	"X"	G	G	R
	II	3-4	Y	Y	R
B	III	"X"	R	R	G
	IV	3-4	R	R	Y
A_1	V	"P"	G	R	R
	VI	"PM"	G	R	R

TRAFFIC FLOW



"X" TRAFFIC DENSITY VARIABLE TIMING.
"P" PRE-TIMED NON-MEMORY ADVANCED GREEN.
"PM" PRE-TIMED "MEMORY EFFECTIVE" ADVANCED GREEN.

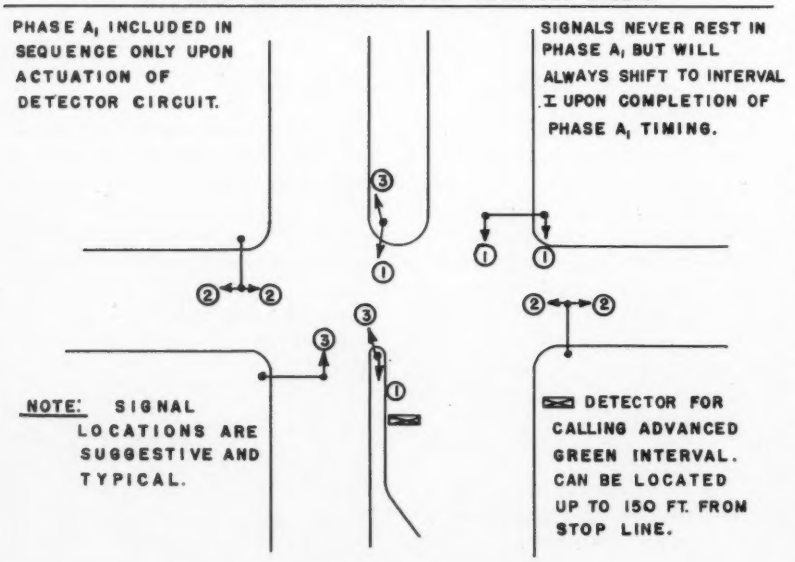

PHASE A_1 INCLUDED IN SEQUENCE ONLY UPON ACTUATION OF DETECTOR CIRCUIT.
SIGNALS NEVER REST IN PHASE A_1 BUT WILL ALWAYS SHIFT TO INTERVAL I UPON COMPLETION OF PHASE A_1 TIMING.
NOTE: SIGNAL LOCATIONS ARE SUGGESTIVE AND TYPICAL.
DETECTOR FOR CALLING ADVANCED GREEN INTERVAL. CAN BE LOCATED UP TO 150 FT. FROM STOP LINE.

Figure 7
Actuated advance green application.

In this application, the green, yellow and red signals for the extended green indications must be wired separately from the opposing indications.

When it comes to restrictive signal indications, it will usually be found that one additional signal circuit and cam-operated contact is required. This circuit is utilized to control the left-turn arrow indications. For a restrictive indication such as illustrated in Figure 5, only three extra signal circuits above the basic six will be required. In the event the alternate color sequence is selected, a total of four extra signal circuit cams and contacts will be required. If it proves desirable to provide a yellow clearance interval after extinguishing the left-turn green arrow and before illuminating the red indication, an additional signal circuit cam and contact would be required.

These details are mentioned only to emphasize the necessity for establishing the color sequence desired before one can accurately determine exactly what is needed in the way of control equipment and wiring to the signal heads.

Practically all flexible pre-timed traffic controllers sold today contain 14 or more signal circuits which is quite adequate for providing these color sequences. In the event an inexpensive traffic controller with limited signal circuit capacity is encountered, it is recommended that a new controller with adequate flexibility be purchased and installed. If for some reason or other this plan cannot be executed, it is possible that some of the extra interval timing units as used with vehicle-actuated controllers can be used to obtain the desired results.

Vehicle-Actuated Signals

If the existing signal indication has either a semi- or full-actuated type of controller, accessory timers are available which can be added to the primary controller to obtain the advance green signal indications. In the event the left-turning movements cannot be segregated, a simple non-actuated advance green timer is utilized.

If the left-turning vehicles can be segregated and it is possible to detect the vehicles desiring to turn left, an actuated advance green timer should be used. This device can be used in conjunction with pre-timed as well as vehicle actuated controllers. Figure 7 illustrates a typical application. With

the actuated advance green timer, the advance green signal indication will only be incorporated in the cycle of operation when a demand is registered for the left turn during a red or yellow interval of the signals controlling the left turns. Actuations received during a green indication are not recorded upon the assumption that vehicles approaching on a green light will be able to make their left turn without difficulty. This may or may not prove to be a logical assumption.

Three Phase Operation

Assuming that vehicles approaching the intersection on a green light after the advance green portion has expired cannot make the left-hand turn because of heavy oncoming traffic, it may prove desirable to provide three phases of operation. The left turn interval can be an exclusive third phase. On the other hand, if an advance green signal sequence is desired, there is available a so-called minor movement timer which can be applied to either semi- or full-actuated controllers that will provide the memory feature during the normal green interval or after the advance green portion has expired as well as the later part of the advance green indications. Figure 8 illustrates a typical application.

Extended green sequences are not easily accomplished at vehicle-actuated installations although they are not entirely out of the question. Generally speaking, a 3-phase or advance green interval obtained with a minor movement timer will usually prove to be a better and simpler application than the extended green indications when vehicle-actuated control equipment is involved.

Other Combinations and Variations

Every problem offers the possibility of a unique solution. Usually an advance green indication is provided for a heavy left turn movement. In at least one instance an advance green signal was provided the opposing and minor traffic! At the particular intersection in question there existed a heavy left turn from Street "B" to Street "A" along with a corresponding heavy right turn in the opposite direction from Street "A" to "B." Straight through traffic on Street "A" was also heavy. Traffic on Street "B" opposing the left turns was light but found it difficult to "fight its way" through the left turning

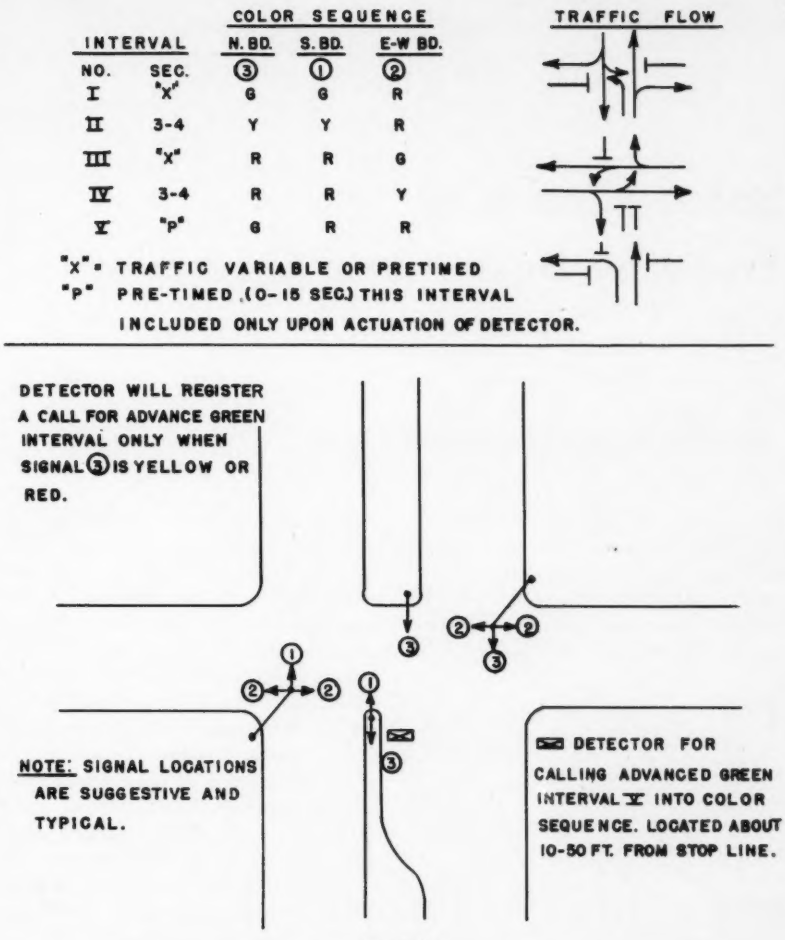

COLOR SEQUENCE
INTERVAL
NO. SEC.
N.BD. S.BD. E-W BD.
③ ① ②
I "X" G G R
II 3-4 Y Y R
III "X" R R G
IV 3-4 R R Y
V "P" G R R
"X" = TRAFFIC VARIABLE OR PRETIMED
"P" PRE-TIMED (0-15 SEC.) THIS INTERVAL INCLUDED ONLY UPON ACTUATION OF DETECTOR.
TRAFFIC FLOW
DETECTOR WILL REGISTER A CALL FOR ADVANCE GREEN INTERVAL ONLY WHEN SIGNAL ③ IS YELLOW OR RED.
NOTE: SIGNAL LOCATIONS ARE SUGGESTIVE AND TYPICAL.
DETECTOR FOR CALLING ADVANCED GREEN INTERVAL V INTO COLOR SEQUENCE. LOCATED ABOUT 10-50 FT. FROM STOP LINE.

Figure 8
Minor movement timer application actuated advance green with memory.

vehicles. Whereas the left turn movement was always heavy, the opposing traffic varied between light to moderate. The intersection was signalized and coordinated in a pre-timed system.

The solution to the problem was to use an advance green for the minor approach and an extended green on the heavy left turn approach. The reasoning and results were that the minor movement was purposely given the chance to enter the intersection first and establish a right of way. The minor movement had difficulty doing this when both approaches were given a green light simultaneously. The advance green indication lasted for only 6 or 8 seconds but was long enough to get vehicles started and into the intersection. As soon as a break in this traffic appeared, the left turns broke through and controlled the intersection. This movement was usually made by vehicles two abreast.

To prevent vehicles on the minor approach from interfering with the heavy left turn movement, the signals provided an extended green interval for the heavier approach. This prevented the clogging of the intersection by permitting the free flow of two lanes of left turning vehicles.

The system is no longer in operation since a much needed by-pass route has been established. It was indeed fortunate that the situation could be solved by new construction. However, there are many cases where by-passes or interchanges are difficult to justify. In such instances, signals, engineering, or just plain ingenuity can prove to be a most workable solution.

It is the author's intent that this article will stir the imagination of others in the solution of left turn problems. There are undoubtedly numerous other solutions that have been tried and proven. It is hoped that others will be prompted to place their comments and suggestions in print.

Some Aspects of Freeway Design and Operation

By Terry J. Owens
Urban Highway Engineer

Automotive Safety Foundation,
Washington, D.C.

The following article summarizes observations of the author on freeway operations made in the course of a year long study during which he visited 15 cities to collect data on freeway design, safety, traffic volumes speeds and economic impact on the community. It was originally presented before a meeting of the Washington Section of ITE.
—Ed.

IN THE VARIOUS CITIES where they are in use, freeways have demonstrated marked superiority over surface streets in terms of safety, speed of movement, and traffic carrying capacity. Control of access, elimination of conflicts at grade, median strips and removal of pedestrians are the design features mainly responsible for this superiority.

Experience to date would seem to indicate that little can be added to the safety and efficiency of freeways by basic design changes. Future gains must come from operational improvements. To be sure some gains may be expected from refinement in design of roadways and ramps. But it is through operational devices to prevent overloading and to impart information to the users that the larger gains will be made.

Refinement in design would include items such as ramp design. For example, the California Division of Highways has found that exit and entrance ramps must not exceed one lane adjoining the freeway lanes. However, they frequently expand to two lanes for storage and turning movements at the arterial street.

Another area — and an important one — is the proper length of acceleration and deceleration lanes. On the Gulf Freeway in Houston these facilities were designed as four degree reverse curves. Fundamental factors affecting the merging operation are:

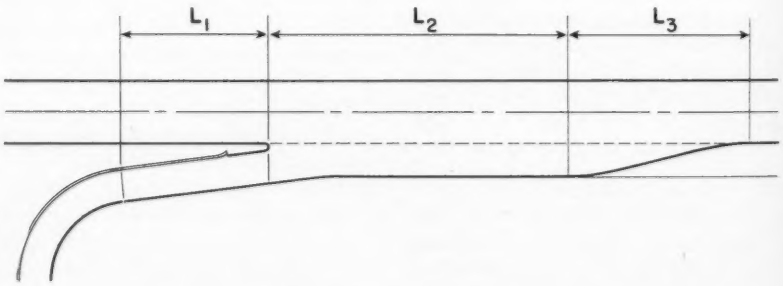
1. Differential in speeds between the freeway lane and ramp speed.
2. Traffic volumes on the freeway lane and merging ramp.
3. Grades on the freeway and ramps.

Albert Rollins, in his thesis for a Masters' Degree from Texas A&M, has given this matter a mathematical analysis. For example, he finds that the total length including acceleration, merging and taper for 50 mph freeway speed and 30 mph ramp speed is 920 feet. This is considerably in excess of present design standards.

The accompanying chart (Figure 1) illustrates his findings.

California has been studying accident frequencies and their relation to ramps. The March-April 1956 issue of *California Highways and Public Works* reports that "off" ramp accidents are three times as frequent as those at the "on" ramp. The deceleration lanes are universally shorter than the acceleration lanes. It has probably been reasoned that all vehicles can reduce speed in a shorter distance than that required for acceleration. This high accident rate appears to be caused by decelerating in the freeway lanes rather than waiting until the vehicle has cleared the through lane. Also significant is California's finding that the volume of traffic that can enter the freeway is more dependent on the sum of ramp and adjacent lane volumes than on the length of the merging area.

Freeway volume studies in California have found that at a 45 mph average speed the outside or merging lane can handle only 800 vph under peak pressures. The second lane is found to carry 1,100 vph whereas the third and fourth lanes are found to carry 1,800 vph each. This totals 5,500 vph, which may be considered practi-



Suggested Lengths of Entrances to Expressways

INITIAL VELOCITY MPH	DESIGN SPEED OF EXPRESSWAY											
	40 MPH				50 MPH				60 MPH			
	L_1	L_2	L_3	TOTAL	L_1	L_2	L_3	TOTAL	L_1	L_2	L_3	TOTAL
10	340	200	190	730	780	270	250	1300	—	—	—	—
20	240	200	190	630	630	270	250	1150	1260	370	310	1940
30	—	200	190	390	400	270	250	920	1000	370	310	1680

NOTE: All values of L_1, L_2, L_3, and Total are given in feet.

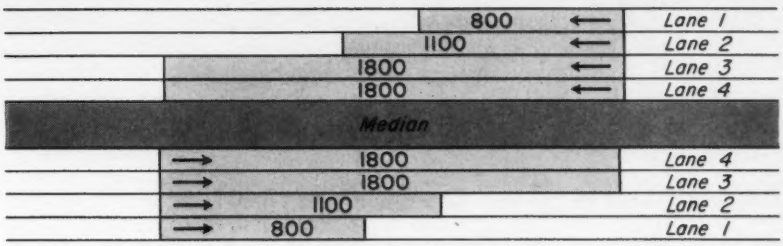
Figure 1

cal capacity for four lanes of an eight-lane freeway. This analysis is at variance with the usually accepted design volume of 1,500 vph per lane which would produce 6,000 vph for four lanes. The accompanying chart (Figure 2) illustrates the California findings.

It is observed that turbulence in the freeway lanes occurs near the ramp locations. This turbulence, illustrated in the accompanying chart (Figure 3), results in reduced freeway capacity. It follows that the fewer ramps the greater capacity. However, a realistic balance must be maintained between freeway capacity and traffic service to bordering areas. The location of ramps must also be influenced by the available reserve capacity of nearby arterials to feed or accept the discharge from the freeway. The design which permits an "on" ramp closely followed by an "off" ramp is particularly undesirable because of the excessive turbulence set up by the cross weaving movements. This situation suggests the addition of an extra lane at these locations to facilitate the mixing operation.

California has utilized the "collector distributor" road idea to reduce the number of ramp conflicts at cloverleafs. As the accompanying photo (Figure 4) shows, ramp connections are reduced to four by this method. Under other design, there could be eight ramp connections, but with the collector road the inner connections are eliminated. The idea has been exploited on the Harbor Freeway adjacent to downtown Los Angeles. The Harbor Freeway is nominally an eight-lane facility, but through this section (see photo) the through lanes have been reduced to three in each direction and two lane collector distributor roads have been built outside of the through lanes, separated by a median. The ramp connections are between the collector roads and the surface streets thereby permitting uninterrupted flow on the through lanes. In addition to providing freedom to the through lanes, the collector distributor roads have proved useful in keeping traffic moving when accidents tie up the through lanes. They also provide additional capacity for through movement when traffic is congested.

Like all superior facilities, freeways are tremendously popular with motorists. It seems that nearly everyone



Typical Lane Capacities
at Peak Hour Operations
Figure 2

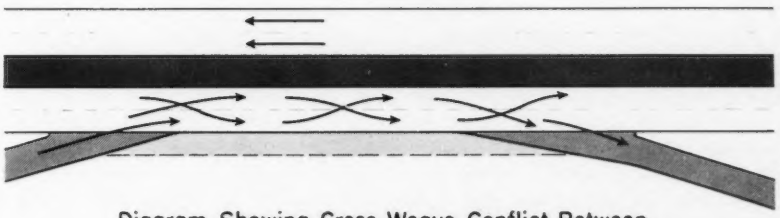


Diagram Showing Cross Weave Conflict Between
"On" Followed by "Off" Ramp
Figure 3

wants to drive on them. Consequently they frequently become overloaded which reduces speed, jangles nerves, and leads to general dissatisfaction. When congestion slows speeds to 35 mph it has been found that the lanes nearest the median are carrying upwards of 2,000 vph. This means that the interval between cars is 1.8 seconds, or 92 feet per vehicle.

As noted earlier, a 45 mph average speed will provide comfortable movement on four lanes for 5,500 vph. Accepting this or a desirable speed, what can be done to prevent overloading beyond this point? Stretching the distance between ramps might accomplish that objective but it would probably produce higher concentrations at the ramps and increased loadings on the surface arterial streets. Can devices be worked out to meter the flow of cars entering a freeway?

It would also seem desirable that the motorist be informed of adverse traffic conditions ahead. If he could be informed that a serious accident four miles ahead had closed the north bound lanes he could get off the free-

(Continued on page 333)

Figure 4
Collector roads reduce number of ramp connections.

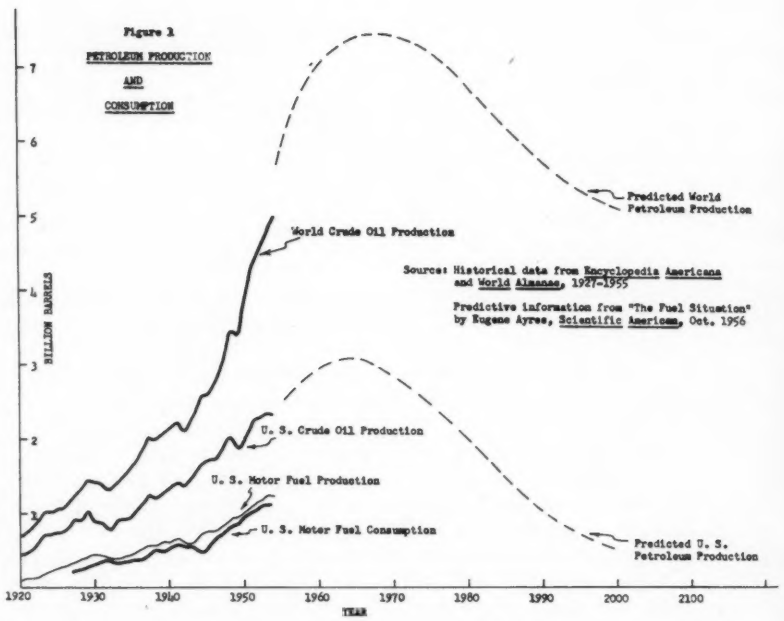
Predicting the Registration of Petroleum-Fueled Motor Vehicles

By Alton Keith Gilbert
(Jun. Mem., ITE)
Junior Civil Engineer
City of San Diego, California

IT IS THE practice of traffic engineers and traffic planners to attempt to predict certain facts about the future by making projections into the future based on historical data. In many cases the engineer or planner is forced to extend a growth or trend curve without having sufficient information to predict changes in the nature of the curve. In other cases additional data is available to help predict these changes. Population curves can be extended into future years by several acceptable methods, and various possible upper limits of population can be predicted using data on available land, available water, and other restricting factors. On the other hand, projections of curves of motor vehicle registration are often depicted rising rapidly to the top of the graph with no indication of peak or decline. Investigations of petroleum reserves indicate that we can predict a peak (and a decline) of the curve of registration of petroleum-fueled, privately owned and operated motor vehicles. This peak and decline will be governed by the availability of petroleum fuel for the vehicle.

Prediction of Motor Vehicle Registrations

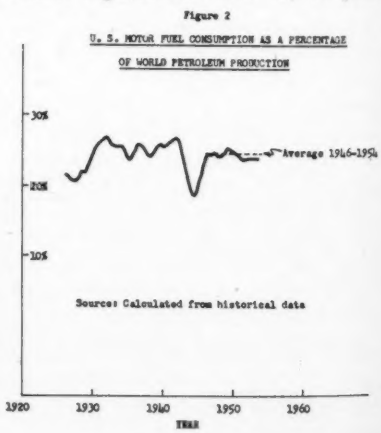
This availability of fuel has been partly predicted in data published by Mr. Eugene Ayres in the *Scientific American*, October 1956 issue. Mr. Ayres presents curves of United States and world future petroleum production (Figure 1) based on present production trends, use trends, and predicted and proven oil reserves. The natural assumption for the traffic engineer to make is that vehicle usage, presently dependent on petroleum, will be affected by the peak and decline of petroleum production predicted by Mr. Ayers.

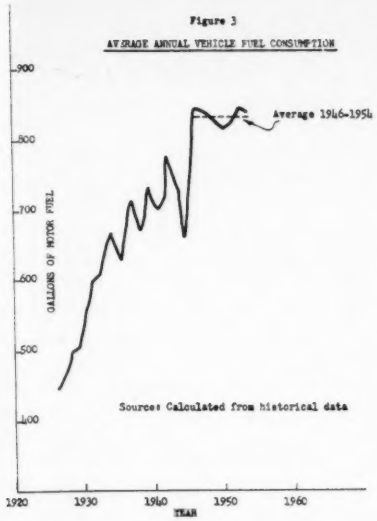


Since 1920 the United States has consumed, as motor fuel, between 18 per cent and 27 per cent of the world's petroleum production (Figure 2). We can assume that such an amount will continue to be available to us as motor fuel as long as the United States is able to preserve its present share of the world's production. The average consumption since 1946 has been 24.4 per cent (Figure 2), and it seems to be a reasonable choice to use only the post-war years as an indication of future trends.

Since 1920 an increasing amount of fuel has been required each year to support one vehicle. In 1926 an average of 444 gallons was necessary. This climbed to a maximum of 844 gallons in 1952 (Figure 3). Vehicle fuel mileage has not changed in this direction; the indication is that a more extensive use of vehicles accounted for the large increase. If we can assume that our average annual fuel consumption per vehicle will remain the same as at present, the post-war trend indicates that the United States will continue to use an average of 832 gallons per year to support one vehicle (Figure 3).

With these assumptions the motor vehicle registration curve can be pro-





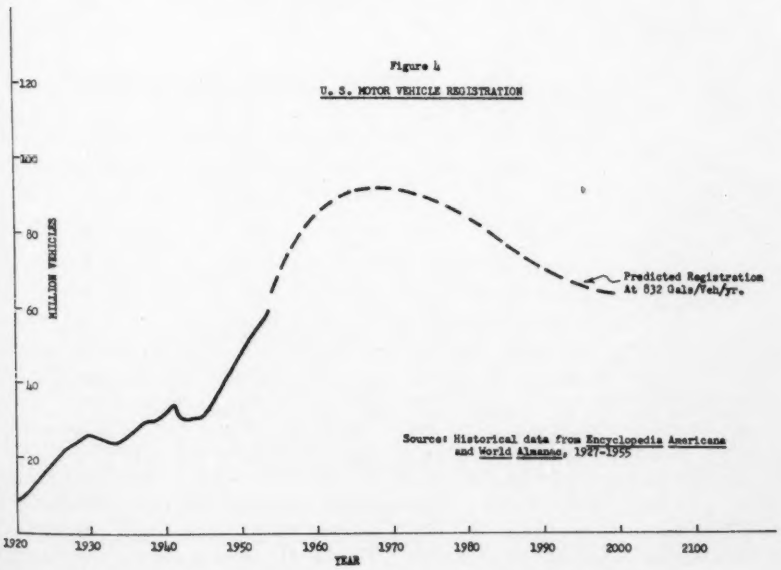
jected as a function of world oil production (Figure 4). The projected curve continues to climb at its present rate, starts to level out in 1960, and peaks in 1970 with 91,000,000 vehicles. The decline follows at a decreasing rate indicating a registration of over 60,000,000 petroleum-fueled vehicles in the year 2000. This, then, puts a ceiling on a problem that lurks in the background of every traffic planning function.

Evaluation of the Prediction

In evaluating this ceiling we can consider several modifying possibilities. The first is that the predictions of oil production might be faulty. Our source, Mr. Ayres, considered many possible influences on oil production and concluded that even the most optimistic estimates of reserves and the most advanced technology could only advance the peak of production a few years. We are nearing the end of the fossil fuel era on our planet.

It is reasonable to believe that we will be able to make more efficient use of the petroleum products available to us as motor fuel. Automotive engines are being developed that will use a lower grade of refined petroleum than gasoline, and presently used engines will become more efficient. Widespread use of smaller and lighter vehicles would reduce fuel consumption per vehicle. If efforts are made in these directions, commencing with the first effects of a reduction in petroleum production, it might be possible to reduce the average annual requirement of each vehicle to half of its present requirement (to 416 gallons per year) by the year 2000. This seems to be a fair guess for a maximum reduction since it is lower than the average annual consumption per vehicle for 1925 and earlier years. The peak would then be postponed to the year 2000 and would be of magnitude 125,000,000 vehicles.

A fair assumption is that the true peak will occur sometime between the two mentioned and somewhere between in magnitude. However, it is foolish to believe that our advancing technology will not prevent any serious decline in the methods available to fulfill our future transportation desires. The nature of such relief is debatable now. Popular mass transportation could change our demand for private transportation drastically before the effects of a petroleum shortage are felt. An efficient electrical accumulator could introduce the age of electric private cars rather than petroleum consuming vehicles. Until these trends and discoveries materialize, petroleum must be consumed in our automobiles; and the end of plentiful supplies of cheap petroleum fuels is in sight. This definitely indicates a peak and a decline in the use of petroleum-fueled vehicles.



Coming Events

June 3-7 — AMERICAN SOCIETY OF CIVIL ENGINEERS—
National Convention, Statler Hotel, Buffalo, N. Y. Contact: ASCE, 29 W. 39 St., N. Y. C.

June 7-8—INSTITUTE OF TRAFFIC ENGINEERS, TEXAS SECTION—
Semi-annual Meeting, Shamrock-Hilton Hotel, Houston, Texas. Contact: Eugene Maier, Room 210 City Hall, Houston, Tex.

June 11-15—WESTERN ASSOCIATION OF STATE HIGHWAY OFFICIALS—
Annual Conference, Shamrock - Hilton Hotel, Houston, Tex. Contact: R. C. Faltinson, Texas Hwy. Dept., Austin, Tex.

June 25-27 — INSTITUTE OF TRAFFIC ENGINEERS, WESTERN SECTION —
Cosmopolitan Hotel, Denver, Colo. Contact: Jack Bruce, Traffic Engineer, City & County Bldg., Denver 2, Colo.

September 9-13—ILLUMINATING ENGINEERING SOCIETY —
National Technical Conference, Biltmore Hotel, Atlanta, Ga. Contact: IES, 1860 Broadway, N. Y. 23, N. Y.

September 23-27 — INSTITUTE OF TRAFFIC ENGINEERS—
Annual Meeting, Statler Hotel, Detroit, Mich. Contact: ITE, 2029 K St. N.W., Washington 6, D. C.

October 13-15 — AMERICAN INSTITUTE OF PLANNERS —
Annual Meeting, Congress Hotel, Chicago, Illinois.

October 14-18—AMERICAN SOCIETY OF CIVIL ENGINEERS—
National Convention, Statler Hotel, New York City. Contact: ASCE, 29 W. 39 St., N. Y. C.

October 21-25—NATIONAL SAFETY COUNCIL—
Annual Safety Congress & Exposition, Congress, Conrad Hilton and other Hotels, Chicago, Ill. Contact: NSC, 425 N. Michigan Ave., Chicago 11, Illinois.

November 18-22 — AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS—
Annual Meeting, Conrad Hilton Hotel, Chicago, Ill. Contact: AASHO, National Press Bldg., Washington 4, D.C.

Civil Service Requirements for Traffic Engineering Positions

A Report of Committee 2B of the Institute of Traffic Engineers, approved by the Technical Council August 11, 1956 and by the Board of Direction January 5, 1957, for publication as an informational report.

CIVIL SERVICE requirements for traffic engineering positions were studied first in 1951 by a subcommittee on traffic engineering education of Department No. 2 of the Institute of Traffic Engineers. At that time, major attention was devoted to civil service requirements for beginning professional positions of the type open to recent graduates of engineering colleges.

Since then the Committee on Civil Service Requirements has collected data on requirements for all levels of traffic engineering positions, from both city and state agencies. Information has been obtained from 84 cities over 50,000 population, and from 30 states. Detailed tabulations are included in Appendixes I and II on page 324 et seq.

Summary of Survey Results—Cities:

1. *Number of Professional Grades.* In 13 of the 21 reporting cities over 350,000 population, there are at least four levels of professional traffic engineering positions. The smaller cities normally have only 1 or 2 grades or levels of professional traffic engineering positions.

2. *Minimum Experience Requirements for Traffic Engineer.* The number of years of experience required for the position of Traffic Engineer varies according to size of city as shown in Table 1. An engineering graduate would need over 5 years experience in the majority of the cities over 350,000 population which replied on the question. For cities below 200,000 population, 35 of 45 require not more than 5 years, and 13 cities require only 1 or 2 years of experience beyond graduation. In most instances, this experience should be in traffic engineering. In many cases, graduate work in traffic engineering can be substituted for a year of experience.

TABLE 1. MINIMUM EXPERIENCE REQUIREMENTS FOR POSITION OF CITY TRAFFIC ENGINEER OR EQUIVALENT

Years of Experience Required of an Engineering Graduate	Number of Cities by Population Group: Over 350,000 Pop.	200,000-350,000 Pop.	100,000-200,000 Pop.	Below 100,000 Pop.	All Cities Reporting
1-2 years	0	1	5	7	13
3-5 years	6	5	8	3	22
6-9 years	4	2	0	0	6
Over 9 years	3	0	1	0	4
Not Specified	9	3	9	6	27
Total	22	11	23	16	72

TABLE 2. MINIMUM EXPERIENCE REQUIREMENTS FOR THE LOWEST PROFESSIONAL TRAFFIC ENGINEERING POSITION IN CITIES* WHICH HAVE MORE THAN ONE PROFESSIONAL GRADE

Years of Experience Required of an Engineering Graduate	Number of Cities by Population Group: Over 350,000 Pop.	200,000-350,000 Pop.	100,000-200,000 Pop.	Below 100,000 Pop.	All Groups
0 years	12	4	4	2	22
1 year	2	1	2	1	6
2 years	3	3	4	1	11
3-5 years	2	3	0	0	5
Not Specified	3	0	3	1	7
Total	22	11	13	5	52

*Does not include 2 cities in which Traffic Engineer is the only professional traffic engineering position.

3. *Minimum Experience Requirements for the Lowest Professional Classification.* Table 2 shows that about half of the cities with more than one professional grade require no experience beyond engineering graduation for the lowest professional classification or grade (22 of 45 cities). In the 1951 survey, the recent graduate was eligible in only 15 of 40 cities.

4. *Minimum Experience Requirements for the Second Lowest Professional Traffic Engineering Grade.* There were 21 cities with three or more professional grades which reported data on experience requirements for the second lowest professional grade. Of the 21 reporting cities, 16 require 2 years or more of experience of the engineering graduate, with 8 requiring 3 years or more.

5. *Scope of Examination for Traffic Engineer Level.* No written examination is required for the position of traffic engineer by 14 of 37 reporting cities. Twenty of the other 23 cities give the written examination a weight of 50 to 75 per cent, with the balance given to oral interview and/or appraisal of education and experience. Of the 21 cities reporting written ex-

aminations, 20 report at least 25 per cent of the questions devoted to traffic engineering. San Francisco is the only city which uses general civil engineering examinations for the position of Traffic Engineer.

6. *Scope of Examinations for other Professional Grades.* Written examinations are required at the entering professional level in 15 of the 22 cities which permit recent graduates to compete for the lowest professional grade. In 8 of the 15 cities, the written examination is devoted primarily to basic engineering, with no special sections on traffic engineering. In the written examination for the next lowest professional level, however, at least 50 per cent of the questions are on traffic engineering in 16 of 22 reporting cities.

Summary of Survey Results—States:

1. *Civil Service or Merit Systems.* A majority of the 30 states replying have a civil service or a merit system, with minimum requirements and specifications for the different professional grades. In many cases, however, the selection of men is based upon appraisal of education and experience, with most of the higher positions being filled on a promotional basis.

2. *Experience Requirements* — Experience requirements generally specify total engineering experience, with several states not specifying any traffic engineering experience. The ITE Job Specifications for State Traffic Engineer specifies eight years in traffic engineering, but does not specify any experience with a highway engineering organization.

3. *Scope of Examinations.* Most states select men on the basis of appraisal and experience. Seven states reported data on written examinations. In Maryland, Michigan and Wisconsin it appears that special examinations are given for personnel in traffic engineering, whereas in the other four states the examination given to traffic engineers is the same as that given to all highway engineers.

Tentative Recommendations

1. At the lowest entrance level for professional positions in states, counties and cities, (Junior or Assistant), recent engineering graduates should be eligible to take the examination. In the written examination, most of the questions should be on basic engineering with 10 to 20 per cent of the questions on traffic and highway engineering. An oral interview may be included. Possibly the interview could be used in selecting from the top three men in the written examination, the man who shows the most promise from the standpoint of appearance and ability to deal with people.

2. At the next higher level in cities (Assistant or Associate grade), two years of traffic engineering experience may be required. The written portion of the examination should have between 50 and 60 per cent of the questions devoted to traffic engineering (including some electrical questions), with 40 to 50 per cent devoted to basic engineering knowledge. A technical problem or two may be part of the traffic engineering portion of the examination. An oral interview should be included, and should preferably count as 30 to 40 per cent of the score on the examination. A year of graduate work in traffic engineering should be

(Continued on page 330)

For Traffic Surveys...
THE TRAFICOUNTER, JR.
is a simple, sturdy, time-tested device for traffic counting. It is pneumatically actuated by means of the road tube attachment.
Traffic volume is easily read on direct reading counter. Can be rapidly installed anywhere. Rugged construction; will last for years.
Write for illustrated Bulletin.
TORONTO, ONTARIO E. A. HORTON SALES CO., 3071 BLOOR ST. WEST
THE STANDARD OF ACCURACY SINCE 1888
STREETER-AMET COMPANY
GRAYSLAKE • ILLINOIS
Branches in Detroit, Pittsburgh, Allentown, Birmingham and Los Angeles

APPENDIX I - CIVIL SERVICE REQUIREMENTS FOR PROFESSIONAL TRAFFIC ENGINEERING POSITIONS

Compiled by Committee 2-B, Institute of Traffic Engineers, August, 1955

Cities By Population Groups	Traffic Engg. Titles or Grades	Min. Requirements: Years Exp. Incl. Coll.	Min. Requirements: Yrs. of T.E. Exp.	Selection Wts., %: Writ. Exam.	Selection Wts., %: Interview & Appraisal	Scope of Written Exam %: Basic Engg	Scope of Written Exam %: Traffic Engg.	Scope of Written Exam %: Other
Over 500,000 Population								
Atlanta, Ga.	City T.E.	-	-	Appointed		-	-	-
	Asst. T.E. III	4	0	75	25	45	20	35
	Asst. T.E. II	2	0	75	25	45	20	35
	Asst. T.E. I	2	0	75	25	-	-	100
Baltimore, Md.	Dir. of T.E.	-	-	Appointed		-	-	-
	Deputy Dir.	10	4	All Are		-	-	-
	Asst. Tr. Dir.	8	3	100% On		-	-	-
	Tr. Plan. Engr.	6	1	Training		-	-	-
	Tr. Design Engr.	4	2	And Exp.		-	-	-
Buffalo, N.Y.	T.E.	12 & P.E.	8	-	-	-	-	-
	Asst. Engr. (Tr.)	7	0	50	30	40	50	10
Chicago, Ill.	City T.E.	Specifications Being Formulated						
	Deputy C.T.E.							
	Assoc.T.E.							
	T.E. III							
	T.E. II							
	T.E. I							
Cincinnati, Ohio	Tr. & Trans. Engr.	9-10	5-6	60	40	10	80	10
	Asst. Tr. Engr.	6-7	2-3	60	40	20	80	-
	Jr. Engr.	4	0	60	40	90	-	10
Detroit, Mich.	Dir. Sts. & Tr.	Extensive	Extensive	50	50	30	70	-
	Asst. Dir.	Extensive	& P.E.	-	-	-	-	-
	Sr. Assoc. T.E.	9 & P.E.	5	50	50	50	50	-
	Assoc. T.E.	9 & P.E.	5	50	50	50	50	-
	Sr. Asst. T.E.	5-7	1-3	50	50	50	50	-
	Asst. T.E.	5-7	1-3	50	50	50	50	-
	Jr. C.E.	4	0	50	50	100	-	-
Houston, Texas	Asst. T.E.	5	0	-	100	-	-	-
	No report on other positions							
Los Angeles, Calif.	Gen. Mgr.	-	-	-	-	-	-	-
	Asst. Gen. Mgr.	9	5	-	-	-	-	-
	T.E.	10	6	-	-	35	50	15
	T.E. Assoc.	7	3	-	-	40	60	-
	T.E. Assist.	4	0	-	-	60	40	-
Milwaukee, Wisc.	Tr. Contr. Engr. V	12	8	-	-	No exams yet.		
	Tr. Contr. Engr. III	7	3	-	-	No exams yet.		
	Tr. Contr. Engr. II	6	0	70	30	30	70	-
	Tr. Contr. Engr. I	4	0	70	30	40	60	-
New Orleans, La.	T.E. IV	(Eligibility For		No Exams				
	T.E. III	(Registration For		Given				
	T.E. II	(All Positions		Recently				
	T.E. I	4	0					
New York, N.Y.	Other Grades							
	C.E. (Traffic)	P.E. & 10	6	100	-	40	60	-
	Asst. C.E.	7	2-3	100	-	50	50	-
	Jr. Engr.	4	0	100	-	100	-	-
Oakland, Calif.	T.E.	7	3	60	40	-	100	-
	Assoc. C.E.	-	-	-	-	-	-	-
Pittsburgh, Pa.	T.E.	7	3	-	100	-	-	-
	Asst. T.E.	8	4	60	40	25	75	-
	Tr. Plann.	6	0	80	20	50	50	-
	Tr. Op. Engr.	6	0	80	20	50	50	
Philadelphia, Pa.	City T.E.	14	7	-	100	-	-	-
	Asst. T.E.	9	5	-	100	-	-	-
	T.E. II	7	3	50	50	20	60	20
	T.E. I	5	1	100	-	20	60	20
San Francisco, Calif.	Engr.	12	0	100	-	100	-	-
	Asst. Engr. II	9	0	100	-	100	-	-
	Asst. Engr. I	7	0	100	-	100	-	-
	Jr. Engr.	4	0	100	-	100	-	-
St. Louis, Mo.	Tr. Comr.	14	5	50	50		none	
	Elec. Engr. III	In E.E.		40	60		none	

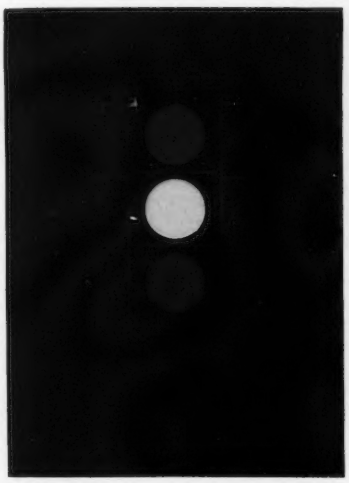
Cities By Population Groups	Traffic Engg. Titles or Grades	Min. Requirements: Years Exp. Incl. Coll.	Min. Requirements: Yrs. of T.E. Exp.	Selection Wts., %: Writ. Exam.	Selection Wts., %: Interview & Appraisal	Scope of Written Exam %: Basic Engg.	Scope of Written Exam %: Traffic Engg.	Scope of Written Exam %: Other
Over 500,000 Population (continued)								
Washington, D.C.	Asst. Dir. GS-13	8	1	0	100	-	-	-
	GS-12	7½	1	0	100	-	-	-
	GS-11	6½	1	0	100	-	-	-
	GS-9	5½	1	0	100	-	-	-
	GS-7	4½	½	0	100	-	-	-
	GS-5	4	0	0	100	-	-	-
350 - 500,000 Population								
Dallas, Tex.	Dir. Tr. Control	Appointed		-	-	-	-	100
	Sr. T.E.	9	5	100	-	10	50	40
	Asst. Sr. T.E.	7	3	100	-	15	50	35
	Jr. T.E.	4	0	100	-	50	20	30
Kansas City, Mo.	Dir. Tr. Dept.	14	10	50	50	40	40	20
	City T.E.	12	8	60	40	60	20	20
	Asst. T.E.	8	3	60	40	60	20	20
Louisville, Ky.	Not under Civil Service							
Portland, Ore.	T.E.	9	5	-	100			
	Asst. T.E.	6	2	40	60	10	75	15
	Jr. T.E.	4	0	100	-	60	20	20
San Antonio, Tex.	T.E.	9	1	-	100			
	Asst. T.E.	6	0	-	100			
Seattle, Wash.	T.E.	13	9	50	50	30	70	-
	Sr. Engr. - Tr.	10	6	50	50	30	70	-
	Assoc. Engr. Tr.	8	4	50	50	50	50	-
	Jr. Engr. Tr.	4	0	50	50	70	30	-
200 - 350,000 Population								
Akron, Ohio	Assoc. Engr.	9	*	70	30	30	70	-
	Asst. Engr.	8	*	70	30	50	40	10
	Jr. Engr.	4	0	70	30	80	-	20
		*Reasonable exp. in street or city planning, plus traffic studies.						
Jacksonville, Fla.	Not Civil Service							
Long Beach, Calif.	City T.E.	Approp. training & exp.		-	-	-	-	-
	Asst.T.E.	7	3	-	100	-	-	-
Norfolk, Va.	T.E.	4	3	-	100	-	-	-
	Asst. T.E.	4	1	-	100	-	-	-
Omaha, Neb.	Dir. of St. Trans. & Tr. Engr.	9	4	100	-	50	50	-
Providence, R.I.	T.E.	5	Var.	-	100	No Civil Service System.		
	T.E. III	5-6	1-2	-	100			
	T.E. II	5	1	-	100			
	T.E. I	4	0	-	100			
Richmond, Va.	City T.E.	9	5	-	100			
	Asst. T.E.	8	4	-	100			
	Note: Need Jr.Engr.Classification.							
Rochester, N.Y.	Dir. Tr. Control	4	3	-	-	-	-	-
	Asst. Dir. Tr.Con.	4	0	-	-	-	-	-
	Jr.Engr. (Tr.)	4	2	50	50	From C.E. List		
St. Paul, Minn.	T.E.	P.E.degree + 10	3	-	-	-	-	-
	Sr. T.E.	P.E. + 8	4	-	-	-	-	-
	Asst. T.E.	P.E. + 4	4	-	-	40-50	50-60(approx)	
	Jr. T.E.	4	0	100	0	100	- (approx)	
Toledo, Ohio.	Com. Div. T.E.	12	8	0	-	No examination		
	Asst. T. E.	8	2	100	-	50	40	10
	Tr. Engr. Assoc.	6	1	100	-	70	20	10
	Tr. Analyst	4	2	100	-	20	40	40
Syracuse, N.Y.	City T.E.	-	-	-	-	No examination		
	Deputy City T.E.	2	2	-	-			
	Jr. T.E.	6	2	60	40	Proposed Spec.		
Worcester, Mass.	T.E.	-	-	-	-	-	-	-
	Asst. T.E.	5	1	60	40	-	-	-
	Jr. T.E.	4	0	60	40	-	-	-

Cities By Population Groups	Traffic Engg. Titles or Grades	Min. Requirements: Years Exp. Incl. Coll.	Min. Requirements: Yrs. of T.E. Exp.	Selection Wts., %: Writ. Exam.	Selection Wts., %: Interview & Appraisal	Scope of Written Exam %: Basic Engg.	Scope of Written Exam %: Traffic Engg.	Scope of Written Exam %: Other
100-200,000 Population								
Austin, Tex.	T.E.	14	10	No Civil Service		-	-	-
	Asst. to T.E.	2	2			-	-	-
Chattanooga, Tenn.	T.E.	8	4	No Civil Service		-	-	-
Des Moines, Ia.	Tr.Tech.	some	-	40	60	40	40	20
	Asst. Tr.Tech.	some	-	40	60	40	40	20
Duluth, Minn.	Not Classified							
El Paso, Tex.	T.E.	9	2	50	50	20	70	10
	T. Sig. Tech.	0	1	50	50	5	25	70
	T. Sig. Elec.	0	1	50	50	5	15	80
	T. Field Insp.	1	1	50	50	10	80	10
Evansville, Ind.	T.E.	P.E. and 2	2	No Civil Service				
Flint, Mich.	T.E. (Police Capt.)	5*	4	50	50	25*	60*	15*
	Asst. T.E. (Police Lt.)	4*	1	50	50	40*	40*	20*
	Police Sgt.	3*	2	50	50	50*	20*	30*
		*Police Exp.					*Proposed	
Gary, Ind.	City T.E.	-	3	-	100			
Grand Rapids, Mich.	T.E.	4+	Yes	-	100			
	Asst. T.E.	-	-	-	100			
	C.E. I.	4+	-	-	-			
Hartford, Conn.	T.E.	No.Spec.	-	-	-	-	-	-
	Tr. Op. Engr.	4	-	30	70	100	-	-
Kansas City, Kan.	T.E.	No.Spec.	-	70	30	35	40	25
Mobile, Ala.	Does not have T.E.							
Montgomery, Ala.	Tr. & Elec. Engr.	4+	Var.	60	40	50	40	10
Nashville, Tenn.	T.E.	4+	Var.	-	100	-	-	-
New Haven, Conn.	T.E.	5	2	70	30	30	40	30
Pasadena, Calif.	Engr. III (Tr.)	P.E.	-	-	100	-	-	-
Peoria, Ill.	T.E.	6 to 8	Var.	-	100	-	-	-
Phoenix, Ariz.	T.E.	4+	4	60	40	29	40	31
	Asst. T.E.	4+	2	60	40	42	58	-
Salt Lake City, Utah	T.E.	-	3	Not Under Civil Service				
San Jose, Calif.	Tr. Analyst	4+	2	75	25	-	30	70*
	Asst. Tr. Analyst	-	some	60	40	-	15	85*
						*Enforcement, Stats.		
Savannah, Ga.	Not under Civil Service							
Springfield, Mass.	T.E.	some	some	-	100	Mayor Appoints		
	Jr. C.E.	4	-	100	-	75	25	-
Tacoma, Wash.	T.E.	4+	3			Unclassified		
	Asst. T.E.	4+	1	70	30	15	80	5
Tulsa, Okla.	T.E.	4+	4	-	-	(Exams not yet devel.)		
	Asst. T.E.	6	-	-	-			
Wilmington, Del.	Not under Civil Service							

What has color got to do with improved signing safety?

A traffic signal, by itself, can control heavy volume traffic loads 24 hours every day. Why? Because it carries the authority of a visual command. This command is given by *color* alone. Today, through the day and night performance of "Scotchlite" Reflective Sheeting, your traffic signs can speak with the same authority.

Traffic signs actually represent your voice, communicating a specific warning to the motorist. "Scotchlite" Sheeting makes sure your voice is heard by commanding attention at any hour, in any weather, with the dynamic, compelling force of vivid color.



Red, yellow and green traffic signal colors have conditioned motorists to the command of color. Traffic signs now can work in exactly the same way.

What does color do?

Reflective color makes your signs stand out from any background. Color emphasizes and strengthens the other sign elements of shape and legend because of its sharp contrast and high visibility. Color enables a motorist, (remember, he is color-conditioned because of traffic signals), to identify the purpose of each sign as quickly by night as by day.

For example, a motorist knows that the yellow sign ahead is a warning sign long before he can read the message. The distinctive diamond shape and vivid yellow color of the reflectorized sign told him so. The same idea holds true for each sign series.

This ability of color to command attention is particularly useful in this day of higher speeds and growing traffic volume. Today, the sign must get the drivers' attention through its own power. The compelling force of reflective color in "Scotchlite" Sheeting gets that attention fast. It warns the driver in time to act safely.

Where do sign colors come from?

They come, as we already have suggested, from the basic traffic spectrum. They are known colors familiar to the driver.

What better color, for instance, than red for a stop sign? Red in traffic signals has always meant STOP in no uncertain terms. The yellow color of the warning series is associated with CAUTION. Following this logical system, the green color, from the GO signal is becoming widely used in distance and direction signs. The white sign is the standard for the regulatory series—which, incidentally, is becoming more distinctive in its own right because of the growing shift to green for directional signs.

So you see, these colors are not new to traffic control. The long association of these colors to specific commands lets a motorist pick out one series from another with ease and at long range. Simply because color has alerted his attention and *pre-told* him what kind of condition to look for, the driver is mentally ready to react to your message.

Other values of color

The reflective color of "Scotchlite" Sheeting, according to some leading authorities, also is a valuable tool to help relieve the monotony of long-distance nighttime driving. Its stimulating effect combats fatigue . . . fights velocitization and hypnagogic conditions. It refreshes the mental outlook of the driver . . . improves his depth perception, helps him judge distances better. It alerts his mind . . . and an alert driver is a safer driver.

The vivid reflective color of "Scotchlite" Sheeting emphasizes sign shape and legend both night and day. It gives dramatic full-time effectiveness to *all three* sign elements.

* * *

Signs of "Scotchlite" Reflective Sheeting speak for you in all these ways. They speak in a voice that calls for attention day and night, in any weather, and from any approaching viewing angle. Get more information, including more data on color, from your 3M Representative soon. Or write for more details to: 3M Company, Dept. GS-47, St. Paul 6, Minn.

REG. U. S. PAT. OFF.

SCOTCHLITE
BRAND
REFLECTIVE SHEETING

PRODUCT OF 3M COMPANY RESEARCH

The terms "Scotchlite" and "3M" are registered trademarks of Minnesota Mining & Mfg. Co., St. Paul 6, Minn. Gen. Export: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ont.

Cities By Population Groups	Traffic Engg. Titles or Grades	Min. Requirements		Selection Wts., %		Scope of Written Exam%		
		Years Exp. Incl.Coll.	Yrs. of T.E. Exp.	Writ. Exam.	Interview & Appraisal	Basic Engg.	Traffic Engg.	Other
Below 100,000 Population								
Abilene, Tex.	T.E.			Not Under Civil Service				
Amarillo, Tex.	T.E.	4+*	-	Exam Waived for Grad in T.E.				
		*Must become registered after 3½ yrs.						
Arlington, Va.	Hwy. Engr.							
	T.E.	Not specified				No recent exams given.		
		"	"					
Beaumont, Tex.	Not under Civil Service							
East Orange, N.J.	T.E.	8	4	60	40	-	100	-
	Asst. T.E.	6	2	60	40	40	60	-
Eugene, Ore.	T.E.	4+	2	0	100	-	-	0
Evanston, Ill.	T.E.	Not specified		-	-	No exams since 1937.		
Fresno, Calif.	T.E.	4+	2	50	50	-	100	-
	T.E. Asst.	3	1	50	50	-	100	-
Glendale, Calif.	T.E. II	7	3	60	40	20	80	-
	T.E. I	Degree or 6	0	60	40	30	40	30
Kalamazoo, Mich.	T.E.	4	2	0	100	-	-	-
Lincoln, Neb.	Captain	5	5	-	-	-	-	-
Madison, Wisc.	T.E.	Several	Several	100	-	50	45	5
Modesto, Calif.	T.E.	4+	3	50	50	15	35	50
Palo Alto, Calif.	None							
Pontiac, Mich.	T.E.	-	-	-	100	-	-	-
Raleigh, N.C.	None							
Rock Island, Ill.	None	Planning to add T.E. position.						
Saginaw, Mich.	T.E.	4	2-5	50	50	30	50	20
Schenectady, N. Y.	T.E.	6	2	50	50	-	-	-
	Asst. T.E.	4	0	50	50	-	-	-
Springfield, Ill.	T.E.	6	2	Not under Civil Service				
Tucson, Ariz.	T.E.	5	1	50	50	30	60	10
Winston-Salem, N.C.	Uses services of consulting engineers.							

APPENDIX II - CIVIL SERVICE REQUIREMENTS FOR PROFESSIONAL TRAFFIC ENGINEERING POSITIONS IN STATES

Compiled by Committee 2-B, Institute of Traffic Engineers, August, 1955

State	Under Civil Service or Merit Sys.	Traffic Engg. Titles or Grades	Min. Requirements: Years Exp. Incl. Coll.	Min. Requirements: Yrs. of T.E. Exp.	Selection Wts., %: Writ. Exam.	Selection Wts., %: Interview & Appraisal	Scope of Written Exam %: Basic Engg.	Scope of Written Exam %: Traffic Engg.	Scope of Written Exam %: Other
Ariz.	No.	Tr. Civil Eng.	8	5	-	-	-	-	-
		T.E. Asst. II	-	-	-	-	-	-	-
		T.E. Asst. I	-	-	-	-	-	-	-
Ark.	Yes	T.E.	14 & P.E.	-	None				
			At least 7 yrs. in lower grades of highway organization						
Calif.	Yes	T.E.	13 & P.E.	0	50	50	-	10	90
		Supv. Hwy.Engr.	11 & P.E.	0	50	50	-	10	90
		Dist. T.E.	9 & P.E.	0	50	50	-	10	90
		Assoc. Hwy.Engr.	7 & P.E.	0	60	40	20	10	70
		Asst. Hwy.Engr.	5	0	60	40	35	5	60
		Jr. C.E.	4	0	100	0	100	-	-
Del.	No.	-	-	-	-	-	-	-	-
Fla.	No.	-	-	-	-	-	-	-	-
Ida.		T.E.	10	6	-	-	-	-	-
		Asst. T.E.	8	4	-	-	-	-	-
		Engr. in Trng. II	6	2	-	-	-	-	-
		Engr. in Trng. I	4	0	-	-	-	-	-
Ill.		T.E. (C.E. VII)	14	10	-	-	-	-	-
		Asst. T.E. (C.E. VI)	14	10	-	-	-	-	-
		Dist. T.E.	14	10	-	-	-	-	-
		Asst. Dist. T.E.	12	8	-	-	-	-	-
		C.E. III	8	4	-	-	-	-	-
		C.E. II	6	2	-	-	-	-	-
		C.E. I	4	0	-	-	-	-	-
Ind.	No	Engr. Tr. & Plng.	10	5	-	100	-	-	-
		Asst. Engr. Tr.	6 to 9	2-5	-	100			
		Engr. in Trng.	4	0	100	-	80	10	10
La.	Yes	Tr. & Plng. Engr. V	P.E. + 8	-	None	-	-	-	-
		Asst. T & P Engr. IV	P.E. + 6	-	None	-	-	-	-
		P.E. III (Several)	P.E. + 3	-	None	-	-	-	-
		P.E. II (Several)	P.E. + 1	-	None	-	-	-	-
		P.E. I (Several)	P.E.	-	None	-	-	-	-
Maine	Yes	T.E.	10	6	-	100	-	-	-
Md.	Yes	Tr. Dir. (Hwy Engr.I)	16-20	-	Optional	Yes	Has traffic option		
		Assoc. Engr.	9	½	Optional	Yes	Has traffic option		
		Tr. Analyst I	6	2	Optional	Yes	-	-	-
		Tr. Analyst III	4	0	Optional	Yes	-	-	-
Mass.	Yes	Hwy T.E.	-	-	40	60	Promotional		
		Asst. T.E.	-	-	40	60	Promotional		
		Sr. C.E.	-	-	40	60	Promotional		
		Jr. C.E.	4	0	100	-	-	-	-
Mich.	Yes	Hwy.Tr.Engr. V	5 & P.E.	5	-	100	-	-	-
		Hwy.Tr.Engr. IV	5 & P.E.	4	-	100	-	-	-
		Hwy.Tr.Engr. III	5	2	75	25	30	70	-
		Hwy.Tr.Engr. II	5	0	75	25	30	70	-
Minn.	Yes	Dir. Tr. & Plng. V.	19	-	-	100	Promotional		
		T.E. IV	15	-	-	100	Promotional		
		Asst. T.E. II	8	-	-	100	Promotional		
		C.E. I	4	-	100	-	100	-	-
Miss.	No	-	-	-	-	-	-	-	-
Mo.	No	-	-	-	-	-	-	-	-
Mont.	No	-	-	-	-	-	-	-	-
Neb.	No	-	-	-	-	-	-	-	-
Nev.	Yes	Tr. Survey Supv.	8-9*	-	-	-	-	-	-
		Plng.Analyst	6*	-	-	-	-	-	-
		Sr. T.E. Aide	4*	2	-	-	-	-	-
			*In business, economics, etc.						
Ohio	Yes	Engr. of Tr. CE VII	-	-	From C.E. Lists				
		Intermediate Grades	-	-	From C.E. Lists				
		Engr. in Trng II	-	-	From C.E. Lists				
Ore.	Yes	T.E. VI	10 + P.E.	5	-	100	-	-	-
		Tr. Cont. Engr. IV	8 + P.E.	4	-	100	-	-	-
		Tr. Invest.Engr. III	6	2	-	100	-	-	-
		Jr. T.E. I	4½	-	-	-	-	-	-
		Eng. Aide II	4	-	-	-	-	-	-

State	Under Civil Service or Merit Sys.	Traffic Engg. Titles or Grades	Min. Requirements: Years Exp. Incl. Coll.	Min. Requirements: Yrs. of T.E. Exp.	Selection Wts., %: Writ. Exam.	Selection Wts., %: Interview & Appraisal	Scope of Written Exam %: Basic Engg.	Scope of Written Exam %: Traffic Engg.	Scope of Written Exam %: Other
S.C.	Yes	Tr. & Plng. Engr. P-6	12	-	-	100	-	-	-
		Asst. T & P Engr. P-5	12	-	-	100	-	-	-
		T.E. P-4	10	-	-	100	-	-	-
		Assoc. T.E. P-3	8	-	-	100	-	-	-
		Jr. T.E. P-2	6	-	-	100	-	-	-
		Jr. Engr. Asst. P-1	4	-	-	100	-	-	-
S.D.	No	-	-	-	-	-	-	-	-
Texas	No	Supv. T.E.	10	-	-	-	-	-	-
		T.E.	8	-	-	-	-	-	-
		Assoc. T.E.	6	-	-	-	-	-	-
Va.	Yes	Tr. & Plng. Engr.	12	5	-	100	-	-	-
		Asst. T. & P.Engr.	11	2	-	100	-	-	-
		T.E. B	9	3	-	100	-	-	-
		T.E. A	6	2	-	100	-	-	-
		T.E. Trainee	4	0	-	100	-	-	-
Vt.	Yes	T.E.	8+	-	-	100	-	-	-
		Asst. T.E.	6	-	-	100	-	-	-
Wash.	Yes	T.E. 7	17 & P.E.	-	-	-		Promotional	
		Prin. Asst. T.E. 6	14 & P.E.	-	-	-		Promotional	
		Asst. T.E. 5	12 & P.E.	-	-	-		Promotional	
		Dist. T.E. 4	11 & P.E.	-	-	-		Promotional	
		Assoc. Hwy E. 3	9 & P.E.	-	-	-		Promotional	
		Asst. Hwy E. 2	6	-	80	20	70	15	15
		Jr. Hwy E. 1	4	-	80	20	80	0	20
West Va.	No	-	P.E.						
Wisc.	Yes	Engr. V	12	8	50	50	75	25	-
		Engr. IV	10	6	50-100	0-50	75	25	-
		Engr. III	8	4	50-100	0-50	75	25	-
		Engr. II	6	2	100	0	100	-	-
Wyo.	No	T.E.	12 & P.E.	2	-	-	-	-	-
		Asst. T.E.	8 & P.E.	-	-	-	-	-	-

CIVIL SERVICE REQUIREMENTS

(Continued from page 323)

acceptable in lieu of a year of experience.

3. At the Traffic Engineer level, from 2 to 8 years of traffic engineering experience should be required, depending on the size of the city. Appraisal of education and experience and the oral interview may constitute the basis for selection, and should comprise at least 50 per cent in cases where a written examination is given. When a written examination is given, its scope should include at least 40 per cent on traffic engineering, with some questions also on administration. Professional registration should be required whenever other comparable engineering positions require such registration.

4. In State Highway Departments and County Road Departments, men for beginning professional traffic engineering positions should be selected from Junior Civil Engineer or Junior Highway Engineer lists. At the next higher level, emphasis may still be placed on highway engineering, but a traffic engineering option is suggested, with a weight of about 20 per cent. A minimum requirement of a year of experience (or a year of graduate work in highway or traffic engineering), is suggested for this grade.

It is suggested that higher grades also have a traffic option, but require experience in highway engineering organizations. The Associate grade (and lower grades) should be open rather than promotional only. Grades of Associate and above should require professional registration if required of other comparable engineering positions.

NOW READY!

1956 PROCEEDINGS

TECHNICAL PAPERS

Presented at the

26th ANNUAL MEETING

of the

INSTITUTE OF TRAFFIC ENGINEERS

San Francisco, September, 1956

136 Pages

$2.00

Order From:

Institute of Traffic Engineers

2029 K Street, N. W. Washington 6, D.C.

Traffic News

Tallamy Sworn in as New Federal Highway Administrator

Bertram D. Tallamy, who resigned in January as Chairman of the New York State Thruway Authority, has been administered the oath of office as Federal Highway Administrator by Secretary of Commerce Sinclair Weeks. He succeeds John A. Volpe, of Massachusetts, who served as interim Administrator since October. Mr. Tallamy left a private engineering firm in January, 1945, to accept the position of Deputy Superintendent of Public Works of the State of New York, and coordinated the State's multi-million-dollar post-war construction program. He was appointed Chief Engineer of the Department in 1947, was named Superintendent of Public Works the following year, and served in this position until December 1, 1954. He was appointed a member of the three-member Thruway Authority in 1950, and the Governor designated him Chairman for a term that was to run until January 1, 1960.

In a recent letter to state highway officials, Mr. Tallamy has promised "to work diligently with each of you in making good on our collective promise to the Congress that we could and would do this job right."

Design Criteria Proposed For Traffic Control Supports

Criteria for the design of supports for traffic control devices have been recommended by a subcommittee of the Highway Research Board. Published as Circular 332 of the Highway Research Correlation Service, a memorandum containing these recommendations is available from the Highway Research Board.

The criteria were developed by a subcommittee of the Committee on Traffic Control Devices, which operates as a part of the Department of Traffic & Operations of the Highway Research Board. Chairman of the subcommittee was W. C. Anderson of the Union Metal Manufacturing Company. The committee project was undertaken at the request of the Joint Committee on Uniform Traffic Control Devices, and represents a preliminary report to be supplemented by recommendations for additional studies, particularly on effects of vibration and on the design for economical foundations to develop resistance to tilting. The criteria as recommended by the subcommittee include those for loads, including wind load and ice load, allowable design stresses for various materials, appearance and foundations.

Sexton Honored in Washington Ceremony

Burton H. Sexton (Mem., ITE) was honored in Washington by a Professional Achievement Award granted in connection with observance of 1957 Engineers and Architects Day. The award, one of six made to young engineers and scientists in the Washington Metropolitan Area, was presented at a luncheon attended by some 700 people. A handsome certificate was presented to Sexton in the name of the sponsoring agencies, which were the D. C. Council of Engineering & Architectural Societies, the D. C. Society of Professional Engineers, the Washington section of the Institute of Radio Engineers and the Washington Academy of Sciences.

A total of 37 nominees were considered by the committee. In its selection of Sexton, the committee cited him for his work as an engineering consultant, at age 33, specializing in traffic and transportation problems. The committee took account of his work with the Indianapolis Railway Company, Capital Transit Company and more recently as a private consultant. In this last area, the committee noted his work for the National Capitol Planning Commission and the Metropolitan Planning Commission of Atlanta.

Sexton is a member of the Institute

of Traffic Engineers and a past president of the Washington Section. He is also a member of the Washington Society of Engineers and has been active in many national committees, both within the Institute and in the traffic field.

(Continued on page 342)

ENGINEERS and ARCHITECTS DAY

Professional Achievement Award

as an Outstanding Young Engineer

presented to

Burton H. Sexton

Traffic and Transportation Consultant

by the

D. C. Council of Engineering and Architectural Societies
D. C. Society of Professional Engineers
Washington Section of The Institute of Radio Engineers
Washington Academy of Sciences

1957 Engineers and Architects Day Committee, J. Lee Cole, *Chairman*

J. J. Littlechales
Chairman, Professional Awards

WASHINGTON, D. C.
METROPOLITAN AREA
FEBRUARY 20, 1957

New Appointments

Kermit Leaves San Francisco for Contra Costa County

Mark L. Kermit (Assoc. Mem., ITE) has been appointed Traffic Engineer of Contra Costa County, California. This county, on the east side of San Francisco Bay, has 400,000 inhabitants, 1000 miles of county roads, and is one of the fastest growing areas in California. The traffic engineer is under the Director of Public Works and the County Road Commissioner.

Mark L. Kermit

Prior to his appointment in Contra Costa County, Kermit was on the staff of San Francisco's traffic engineer, Ross Shoaf, where he spent three and one-half years in various responsible positions in the maintenance, operations and design sections.

Born in Vienna, Kermit came to the United States in 1938 after completing his high school education. He saw active service with the U. S. Army in Europe during World War II, and after hostilities were over he served in the U. S. Military Government in Germany.

He received a B. S. Degree in civil engineering from Columbia University in 1948. In recent years he has done graduate work on a part-time basis at the Institute of Transportation and Traffic Engineering at the University of California and received his Master of Engineering degree in January of this year. Kermit is also a registered civil engineer in California.

Kanz Becomes First City Traffic Engineer In Rockford

Anthony C. Kanz (Jun. Mem., ITE) has been appointed the first city traffic engineer in Rockford, Illinois. He assumed his new duties in Rockford late in January, where he will be responsible for a newly organized traffic engineering department under the Public Works Commission.

Kanz had previously served in Philadelphia as chief of the Traffic Survey

Anthony C. Kanz

and Planning Division. Prior to serving in Philadelphia he had worked for the Arizona Highway Department and as traffic control engineer in the Milwaukee Bureau of Traffic Engineering and Electrical Services.

A graduate of the University of Wisconsin in civil engineering, Kanz was an ASF Fellow at the Yale Bureau, receiving his certificate there in May, 1954.

In addition to his Institute membership, he is a Junior Member of the American Society of Civil Engineers.

Batts Appointed Traffic Engineer In Ft. Lauderdale

Herman M. Batts, Jr., (Assoc. Mem., ITE), formerly Traffic Engineer of the Detroit Municipal Parking Authority, has been appointed Traffic Engineer for Fort Lauderdale, Florida. He assumed his new position on February 6.

Batts, a registered professional engineer in Michigan, was with the Detroit Parking Authority for five years. Prior to that he was a traffic engineer with the Detroit Department of Streets and Traffic.

He graduated from Case Institute of Technology in civil engineering, and attended the Yale Bureau, receiving his certificate in June, 1949.

In 1955 and 1957 he served as a consultant on the design of two parking decks for the University of Michigan the first of which was opened early this year. He reports that his initial duties in Fort Lauderdale will include retiming signals and revising lane lines and older channelization projects.

Schoppert Leaves Oregon to Join ASF Staff

David W. Schoppert (Jun. Mem., ITE) has joined the staff of the Automotive Safety Foundation as a member of the traffic engineering division.

Schoppert has been with the Oregon State Highway Department since 1951, spending most of the time in the traffic engineering division. Since 1954 he has headed the economic unit of the planning survey section. In this capa-

David W. Schoppert

city he had as a major responsibility the conduct of surveys in Oregon cities.

A graduate of Oregon State College, Schoppert has had experience as a county engineer and in the contracting business. He is a veteran of World War II, serving 18 months in the Pacific with the Coast Guard. He is a registered professional engineer in the state of Oregon.

Positions Available

BALTIMORE, MARYLAND

Position: Traffic Design Engineer

Requirements: Civil Engineering degree, with 2 years of experience in Traffic Engineering work, including one year in collection, analysis, interpretation of data, and geometric design, or equivalent combination of training and experience.

Salary: $6168-$7452.

Apply: Department of Traffic Engineering, 413 St. Paul Place, Baltimore 2, Maryland.

Position: Traffic Planning Engineer

Requirements: Degree in Engineering (preferably Civil Engineering); 6 years experience in planning and design of streets and boulevards as related to traffic movement, 2 years of which must have been in supervisory capacity.

Salary: $6468-$7824.

Apply: Department of Traffic Engineering, 413 St. Paul Place, Baltimore 2, Maryland.

PATERSON, NEW JERSEY

Position: City Traffic Engineer, to head new division.

Qualifications: Engineering graduate with special courses in traffic engineering. Experience preferred but not necessary.

Salary: $8000 per annum, depending upon qualifications.

Apply: O Wayne Noble, Director, Planning Board, City Hall, Paterson, N. J.

AUSTIN, TEXAS

Position: Assistant Traffic Engineer

Qualifications: Graduate civil engineer with four years' experience — traffic engineering experence preferable. Will collect, analyze and interpret data to measure existing controls and plan future control and operational needs. Will make geometric designs for traffic facilities.

Salary: Starting salary will range from $435 to $513 per month, depending upon experience, with increases at the end of six months and at intervals thereafter.

Apply: Personnel, City of Austin, Box 1160, Austin, Texas.

WICHITA, KANSAS

Position: Assistant Traffic Engineer

Qualifications: Engineering degree from a recognized college or university and registration as a professional engineer or engineer-in-training.

Salary: $467 to $565 per month.

Apply: J. E. Angell, Traffic Engineer, Room 207 City Building, Wichita, Kansas.

LOS ANGELES, CALIFORNIA

Position: Traffic Engineering Assistant

Qualifications: Engineering graduate from recognized college or university or possession of a California engineer-in-training certificate.

Salary: $464 to $575 per month (higher if registered as California civil or professional engineer).

Apply: Room 5, City Hall, Los Angeles, California, with $1.00 filing fee.

SANTA MONICA, CALIFORNIA

Position: City Traffic Engineer (new position)

Requirements: Degree in engineering with five years traffic engineering experience, at two years in a supervisory capacity. Graduate study desirable.

Salary: $615 to $738 per month.

Apply: Personnel Director, City of Santa Monica, Santa Monica, California.

EL PASO, TEXAS

Position: Assistant Traffic Engineer

Requirements: Engineering degree from an accredited college or considerable experience an training in traffic engineering field.

Salary: $5808 to $6431.

Apply: Mr. Ben D. Culleton, Personnel Director, 310 E. Missouri St., El Paso, Texas.

NEAR LOS ANGELES, CALIFORNIA

Position: Traffic Engineer. City of Vernon.

Requirements: Only a man with years of experience solving difficult traffic congestion problems can be considered. This is a permanent position. Excellent working and living conditions. Write in full. Enclose photo.

Salary: Top

Apply: Wendell H. Kinney, 410 Solano Avenue, Los Angeles 12, Calif.

FREEWAY DESIGN

(Continued from page 319)

way and to his destination by other routes. This might be accomplished by signs or by radio.

For normal freeway design a few rule-of-thumb criteria may be of interest:

One mile between interchanges is a desirable minimum with one-half mile an absolute minimum.

An absolute minimum of 600 feet between points where the vehicle operator must make a choice of roadways must be provided.

Freeway curvature should be held to a minimum 2,000 foot radius for all except the most compelling circumstances.

All freeways constructed to date are carrying far in excess of estimated volumes. For this reason wider medians with resultant increases in right of way and structure costs would have been a prudent investment. There is no substitute for space.

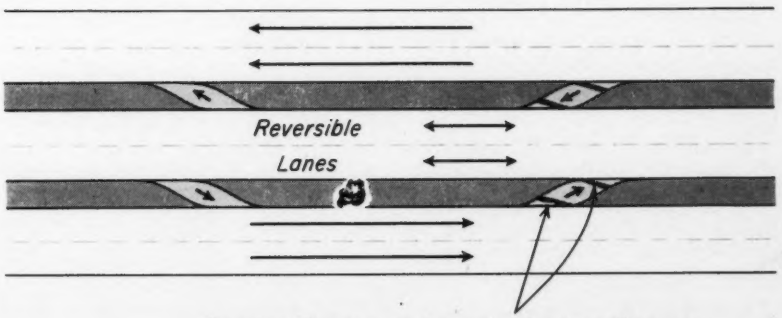
Shoulders on the right are a must for all freeways. Shoulders on the median are needed for six and eight lane freeways.

Design for peak hour conditions — the rest of the day will take care of itself.

Turning from the known to the unknown, there are many ideas to consider. Here are just two unanswered questions:

Can the reversible lane idea, as illustrated in Figure 5, be applied to freeway?

Is there any traffic and/or economic advantage in constructing a super freeway in which the long-distance through lanes are separated from the medium-distance lanes?



Barrier Fences to be raised when flow on reversible lanes is opposed to freeway lanes

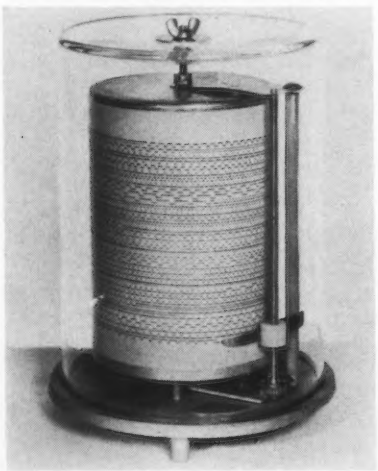
Figure 5

Strictly Business

New Operations Recorder Available

A new and compact operations or events recorder is now available from Gorrell & Gorrell, Haworth, New Jersey. It consists of a drum which rotates at speeds from four minutes to 24 hours per revolution, and can be used to graphically record the operation or non-operation of a particular machine or piece of equipment.

No ink is used. A stylus rests against the chart paper which is coated with white opaque wax crystals. The pressure of the stylus exposes the color of the paper beneath the wax coating. More than 400 linear inches of accurate recording can be had on a waterproof and easily filed chart 6″ x 14″. Various drum speeds are available.



Housing Standard Offered for Flasher Light

The Gen-A-Matic Corporation, of 14741 Bessemer Street, Van Nuys, California, is introducing a new light housing standard, the S1000 for use with the company's 2-Way Flasher Light.

The standard has a 25-pound cast iron base to insure stability, and a hood that fits over the Gen-A-Matic light so that it offers good daylight visibility. Side locks on the standard prevent theft of the flasher light.

Requiring far less space than the conventional barricade, the S1000 light housing standard is ideal for use on construction projects, road or street hazards, or as an in-plant warning signal.

The S1000 is in production now and is available for immediate delivery. It may be ordered with or without the Gen-A-Matic 2-Way Flasher Light.

Overhead signs at the Suffern Interchange of the New York Thruway, built by Union Metal.

New Battery-Operated Traffic Cone Flashing Device

A new traffic cone flashing device designed to extend marker visibility at night and replace presently used oil-burning lamps has been developed by Belltron Mfg. Co., 646 Hoover Ave., Bloomfield, N. J.

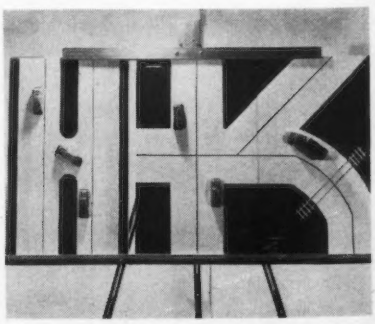
This flashing device measures 13″ from top to bottom. Light diameter—2¾″—permits unit to fit into open top of cone snugly. Light extends 2″ beyond top of cone and is plainly visible in darkness at 400 feet. A bi-metalic flashing element is incorporated within the bulb and flicks on and off in 2 second intervals. Operating current is provided by four standard flashlight batteries from which 108 hours of continuous operation is claimed.

Resembling the common flashlight, this device has an all metal body which is plated and baked enameled for moisture proofing and to resist corrosion. The plastic lens is of the standard "bee-hive" type and is held in position by a plated metal snap ring. The entire unit is welded except for switch assembly which is riveted to provide for greater elasticity to construction. Because the case acts as ground, operation is not interfered with during inclement weather. Red, amber, white, or green lenses may be specified.

Magnetic Traffic Board Available

A magnetic board suitable to display traffic situations is available from the Sales-Aid Company, 149 Grayson Avenue, Trenton 9, New Jersey.

Constructed in three sections to provide the greatest flexibility in depicting typical intersections, the board is suitable for teaching purposes, courtroom use and public display purposes. Available are scale models of vehicles, traffic signals, signs and other highway features equipped with permanent-type magnets which will adhere to the board even when displayed in a vertical position.



SHOW THEM HOW TO MAKE BETTER SIGNS

One of a series of reports to Traffic Engineers and Highway Officials on

BETTER SIGN MATERIALS

FACTS ABOUT PLYGLAZE® AND PLYALOY® OVERLAID PLYWOOD

- **WASHINGTON STATE SIGNS;** PlyGlaze Case History
- **COLORFAST BLACK PLYGLAZE;** No Paint Needed
- **DFPA VANDALISM TESTS;** Trial by Gunfire

PlyGlaze case history

Under its current signing program, Washington State has standardized on high density overlaid plywood for all fully reflectorized large information and directional signs. The state also uses the material for standard reflectorized warning and regulatory signs.

Work is carried on by the State Highway Department under the direction of Rex Still, State Traffic Engineer, and Al Solberg, Sign Engineer. Both have long been regarded as leaders in the highway sign field.

Under the new program, signs are made to state specifications by independent contractors, most of whom rely almost exclusively on St. Paul's PlyGlaze.

Washington has had experience with ordinary plywood as well as metal signs. The reasons they have switched to high density are primarily cost, durability and fool-proof bonding of reflective sheeting. The high density plywood signs cost less in the long run and even have an advantage in initial cost, because no prime coat is needed before applying reflective sheeting.

PlyGlaze stands up better under severe weathering and accidental or deliberate abuse. Because there is no progressive deterioration after gunshot or other damage, a slightly damaged sign can remain in service where signs of other materials would rust or corrode to the point where they would require replacement.

In commenting on sign materials, both Messrs. Still and Solberg are emphatic about one point: high and medium density overlaid plywood must not be confused. High density (PlyGlaze) requires no paint protection, permits direct bonding of reflective sheeting; medium density (PlyAloy) is for painted signs and must be primed before reflectorizing.

Their note of caution is strongly seconded by the St. Paul Technical Department. Both are excellent materials, but each is tailored for different signing conditions: high density, reflectorized, for 24-hour traffic; medium density, plain painted, for daylight conditions.

black background signs

Black PlyGlaze is now being used by several states for plain painted or reflectorized legend signs. The jet black overlay is attractive and can be used "as is" with legend applied directly to the panel. It requires no paint protection and because the color is permanently integral with the phenolic-resin overlay, it will not fade or bleach under even the most severe exposure.

trial by gunfire

Extensive vandal and abuse resistance tests conducted by Douglas Fir Plywood Association show that the sign base material has everything to do with whether or not a highway sharp-shooter can render a sign hors de combat.

The net of their findings is that overlaid plywood suffers substantially less from damage by gunfire than either steel or aluminum. Not only is initial damage less, but there is no progressive deterioration as with metal.

Tests were conducted under carefully controlled conditions using standard 24" square reflectorized signs of 5/8" overlaid plywood; 6061-T6 type .081" aluminum; 16 gauge bonderized steel. Signs were shot with .22 and .38 caliber and .300 Savage bullets.

Holes in the plywood were small, sharply defined. Slugs tore jagged holes in aluminum and created shock areas loosening reflective sheeting. The .22 and .38 bullets did not completely pierce steel signs, but created large shock areas which removed sheeting, exposing metal; .300 Savage slugs went through the steel.

If you'd like the complete 32-page test report, please mail coupon.

description, specifications

PLYGLAZE:* Exterior plywood with high-density phenolic resin-fiber overlay fused to both sides of panel. Overlay is hard, glossy, abrasion resistant, need not be painted. Ideal base for reflective sheeting. Colors: buff, black.

Specification: PlyGlaze (B-B) 60/60 High Density Overlaid fir plywood, manufactured by St. Paul & Tacoma Lumber Co.

PLYALOY:* Exterior plywood with smooth, durable medium-density overlay on one or both faces. Overlay is ideal paint base; has texture similar to expensive drawing paper. Color: buff.

Specification: PlyAloy Medium Density Overlaid fir plywood, faced both sides (F2S) . . . or faced one side (F1S) . . . manufactured by St. Paul & Tacoma Lumber Co.

*Both PlyGlaze and PlyAloy meet U.S. Commercial Standards, are DFPA-Inspected. Available in standard plywood sizes, thicknesses.

FOR MORE INFORMATION (detailed specifications, application data, etc.), **please mail coupon**

ST. PAUL & TACOMA LUMBER CO. — TREE LIFE FOREST PRODUCTS — ESTABLISHED 1888

St. Paul & Tacoma Lumber Co., Dept. TE, Tacoma 1, Wash.

Send literature and/or material checked:

- ☐ Specification & Application Data
- ☐ Samples and Current Prices
- ☐ Complete Vandalism Report

Name_____

Firm or Dept._____

Address_____

City_____ Zone____ State_____

New Publications

Road Roughness and Slipperiness.
Bulletin 139, Highway Research Board, Washington 25, D.C., February 1957, 84 pp., $1.60.

This bulletin contains five papers presented at the HRB 35th Annual Meeting, January 1956.

The first paper, by Gale Ahlborn and Ralph A. Moyer, deals with modifications to the BPR roughness indicator as developed in California, together with some test results using the equipment on actual pavements.

In the second paper, B. R. Petrok and K. L. Johnson describe modifications developed in Minnesota for the same instrument.

Virginia experience with skid resistant pavements is described by F. P. Nichols, J. H. Dillard and R. L. Alwood in a paper giving several different methods of test, and the results of stopping distance tests made at several hundred locations in that state. An appendix contains valuable notes on Virginia geology and aggregate sources.

In a paper describing similar work, H. L. Michael and D. L. Grunau discuss the program of developing skid testing in Indiana and the results of tests in that state.

How passenger car speeds are affected by driver reaction to wet and dry pavement conditions was the object of a New York State study reported by Walter Stohner in the fifth paper.

Median Design:
Effect on Traffic Behavior
Bulletin 137, Highway Research Board, Washington 25, D.C. January 1957, 26 pp., $0.60.

Two reports on research studying the effects of different types and widths of median dividers on traffic behavior and accidents are contained in this bulletin.

The first of these papers gives the results of observations and comparisons made in New York State and supplements earlier studies on multilane highways in that state reported to the Board in 1951 (HRB Bulletin 35). Both traversable and barrier-type medians were investigated in the New York studies.

The other report, prepared at the Yale University Bureau of Highway Traffic, gives an analysis of accident experience involving various widths of traversable medians on limited access highways. The influence of trees planted in a median is discussed.

Motor Vehicle Inspection—Approved
American Association of Motor Vehicle Administrators, Washington, D.C., and Association of Casualty & Surety Companies, New York, New York, 1957, 6 pp. (folder), free.

This pamphlet is sponsored jointly by AAMVA and the Association of Casualty & Surety Companies and is intended for distribution to officials, safety organizations, citizen groups and others interested in promoting periodic inspection of motor vehicles. The publication presents logical arguments, supported by facts, in favor of inspection and describes briefly ways in which inspection programs are administered in the 14 states (and the District of Columbia) requiring periodic inspection.

Shopping Centers Restudied
Technical Bulletin No. 30, Part I, Urban Land Institute, 1200 18th Street N.W., Washington 6, D.C., 80 pp., 1957, $5.00.

Plans of 118 shopping centers have been analyzed by the Community Builders' Council of the Urban Land Institute. This analysis is reported in the first of a 2-part technical bulletin devoted to shopping centers. The study shows that shopping centers fall into three distinct types:

the *Neighborhood Center* built around a supermarket or drug-store and serving 7,500 to 20,000 persons.

the *Community Center* built around a variety of junior department stores in addition to the supermarket and serving from 20,000 to 100,000 persons.

the *Regional Center* built around one or two major department stores and requiring at least a quarter million persons to support it.

The bulletin goes on to report some of the pitfalls of bad location, poor design and improper leasing policies. Based on the shopping centers studied, it makes recommendations for orienting centers to young urban families and their buying habits.

A Community Bicycle Safety Program
Association of Casualty & Surety Companies, New York 38, New York, 30 pp. (plano.) 1956, free (limited quantities).

This attractive booklet suggests in step-by-step fashion a community-wide bicycle program. Included are: a complete outline of bicycle testing, registration, and licensing operation, with tests; a copy of the model bicycle ordinance suggested by the National Committee on Uniform Traffic Laws and Ordinances; procedures followed by student bicycle safety courts; and a list of sources for additional help. The publication is available in limited quantities without charge for use by individuals and groups interested in starting and maintaining comprehensive bicycle safety programs.

TRAFFIC ENGINEERING HANDBOOK AVAILABLE

Revised and Expanded Second Edition — 1950

— CONTENTS —

Vehicle, Travel and Highway Facts — Vehicle Motion — The Driver — The Pedestrian
Traffic Accidents — Traffic Studies — Traffic Markings and Markers — Traffic Signs
Traffic Signals — Parking and Loading — One-Way Streets and Arterial Routes
Roadway Capacity and Design — Speed Regulation and Zoning — Traffic Islands and
Pedestrian Barriers — Pedestrian Islands and Bus Loading Zones — Street and
Highway Lighting — Traffic Engineering Terminology

Order your copy now ($6.00 per copy) from

Association of Casualty and Surety Companies
60 John Street, New York 38, N. Y.

OR

Institute of Traffic Engineers
2029 K Street NW
Washington 6, D.C.

19 SIGNAL CIRCUITS!

...Eagle controller is wired for tomorrow's traffic

True, you may not need 19 circuits today. But this table shows how you may need them in the not-too-distant future. Then remember that this Eagle EF-20 controller is already wired for 19 circuits. You won't have to have it "rebuilt" or replaced to handle the greater traffic movement of tomorrow.

Any desired Eagle accessories can be added right in the field. Even adjustments and maintenance are easy, as components are either hinged or jack mounted.

This 3-dial controller has cycle length adjustment from 30 to 130 seconds. And each dial is furnished with 3 resets for flexibility in an interconnected system. Send for Bulletin E-20.

POSSIBLE CIRCUITS NEEDED TOMORROW	
3	for green, amber, red
1	for turn arrow
2	for walk, don't walk
6	
×3	for three-movement intersection
18	
+1	for special local condition
19	

MAIL COUPON TODAY

EAGLE

EAGLE SIGNAL CORPORATION
Municipal Division
Moline, Illinois

EAGLE SIGNAL CORPORATION
Municipal Division, Dept. MSE-157
MOLINE, ILLINOIS

Please send Bulletin E-20 on the 19-circuit controller.

NAME AND TITLE _____

ORGANIZATION _____

FULL ADDRESS _____

Section News

METROPOLITAN (New York) SECTION

Ernest Boulding, Chairman, Newsletter Committee

An afternoon and evening's meeting was held in the offices of the New Jersey Turnpike Authority at New Brunswick, New Jersey on January 24.

Members of the Turnpike Authority Staff explained various items at the afternoon field trip which was attended by 30 Section members and guests. Features of this trip included: inspection of the toll equipment and methods at a typical toll plaza and of one of the state police radio control rooms; examination of some interior illuminated, plastic, overhead signs and of some sign bridges; and a bus trip over the Newark Bay-Hudson County Extension.

Forty-eight members and guests attended the dinner meeting which was held in the Turnpike Administration Building Cafeteria and which featured talks by Mr. Robert Mosher, Assistant Comptroller, and Mr. Robert Ott, Toll Audit Supervisor for the N. J. Turnpike Authority.

After the meeting was called to order by *President Quimby* and the minutes of the last meeting received approval, *Ed Wetzel*, National Secretary-Treasurer, briefly reported on the growth of the Institute which was discussed at the January meeting of the Board of Direction. The topics included: the distribution of Institute members by membership classes, and whether there is a need to redefine any district boundaries. It was also reported that there are now 1022 Institute members, that three student chapters (Cornell, Yale and Illinois) are active and that 2 student chapters (Michigan State and Purdue) are being organized.

President Quimby reported that the Institute Board of Direction voted to hold the 1959 Annual Meeting in New York City and that preliminary arrangements are being made for the meeting. Various committees will be appointed soon to make the 1959 Annual Meeting the best one in the Institute's history.

Upon receipt of a communication from the New England Section, the members present moved to indorse the nomination of Mr. Fred Hurd as a candidate for Director from District 1.

After the Membership Committee reported on the three prospects for local section affiliates, the membership voted to extend invitations to Mr. Perrie Nutwell, Mr. Lewis Walter and Mr. Lee Broadwin to join the Section.

Once the Section business was completed, Mr. Ott outlined briefly the functions of the four sections within the Toll Audit Department of the New Jersey Turnpike Authority. The use of office machines to facilitate the Department's functions was emphasized.

The first section handles all functions relative to ticket preparation. The toll tickets are pre-coded and pre-printed with information, such as toll rates, point of entry and class of vehicle, prior to being sent to the toll booths.

The second section handles all functions relative to Collector Audit. The tickets are examined to see that the collector has returned every ticket that he time-stamped, that the collectors have time-stamped a ticket for every vehicle passing through the toll booths and that the money deposited in the bank checks with the money computed from the tickets.

All functions related to the preparation of statistical reports are handled by the third section. Summary reports of totals by class, by entry, by exit and by direction of travel are prepared daily, weekly, monthly and annually.

The fourth section does non-scheduled work of a semi-confidential nature such as spot audits and detailed analysis of tickets.

Following the lecture, the group toured the Toll Audit Department where various machines were demonstrated and samples were available for analysis.

Congratulations!

Ray and *Betty Cottam* have announced the birth of a baby girl, Carrilee, 8½ lbs., on January 13, 1957. Ray, who is employed by the New York City Dept. of Traffic, is studying at the Yale Bureau of Highway Traffic this year.

Personals

It has been reported that *"Teke" Wiley* took part in Mike Wallace's show on Tuesday, January 26th and that "Teke" did an able job answering the pointed questions concerning the New York City traffic problems. Good work, "Teke"!

Lou Bender was a T.V. guest personality on Ted Steele's Variety Show, a late afternoon program, on Tuesday, February 5th. The people who heard Lou, say that he competently discussed the subject of traffic safety. Keep up the good work!

Charlie Murphy recently appeared on a CBS television show, "Right Now," and discussed New York City's off-street parking program with Art Kane of the Department of Traffic and other guest panelists. Ron Cochran was the moderator.

Charlie also participated in Bill Cullen's WRCA "Pulse" radio show on February 8th during which he spoke of the need for establishing realistic speed limits based on traffic engineering studies.

OHIO SECTION

J. A. Carrothers, Secretary

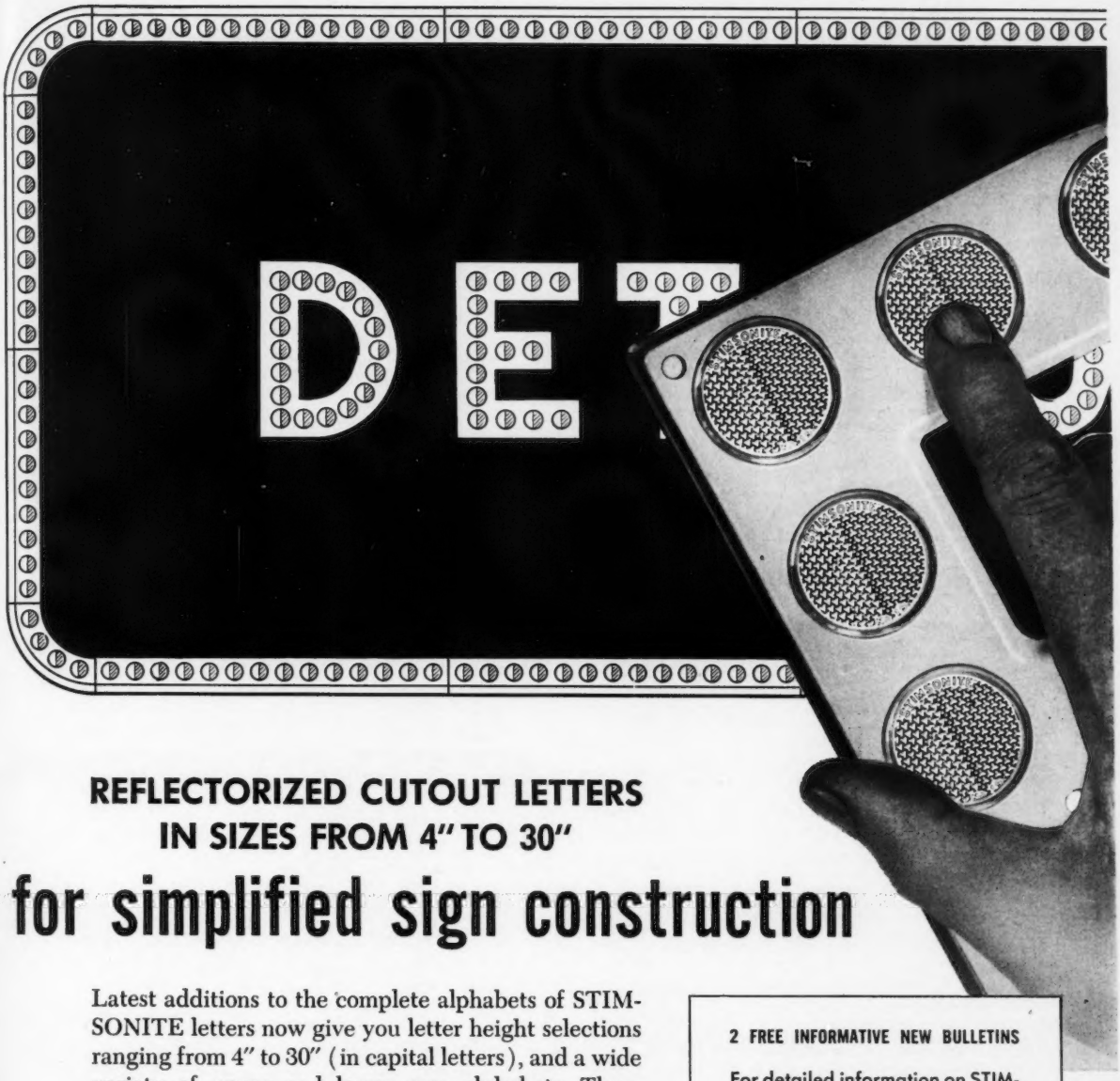
At the January 25th meeting of the Ohio Section in Columbus, it was announced that membership had reached a total of 60 with 29 being affiliate members. The meeting was highlighted by an address by Mr. August Schofer of the district office of the Bureau of Public Roads in which Mr. Schofer cited the relationship of traffic engineering with the new interstate road program. Mr. Schofer stated that, "Because the Interstate System is expected to serve from 20 to 25% of all traffic, and traffic is expected to grow at 4% per year, existing parallel surface facilities will not become deserted. Studies have shown that demands could arise far exceeding the capacity of a single Interstate route so that existing streets will continue to carry an increasing share of generated and induced traffic.

"The operations angle will pose new and greater problems. New and improved operational skills and techniques will be required to insure the smooth and safe flow of traffic. This has already been proven on expressways now in use. Driver behavior is the key to this phase of action. Changed conditions will require changes in habits and attitudes.

"Moving large traffic volumes requires policing — not merely for detecting violators but keeping traffic fluid. Trouble spots must be detected as they occur, so that action may be taken immediately for their correction. We dare not wait until the freeway and adjoining street systems become clogged with vehicles at a standstill. Means for removing the broken down vehicle—the ones which run out of gasoline —must be found. If the break down or stall occurs in the outer lanes, its removal is not too great a problem—if the median width will permit. But what if it occurs on the two inner lanes or on long bridges? How can we keep the whole route from being fouled up by the impatient drivers, bypassing the stalled vehicles and reducing the capacity of even the other lanes? Fender bending, and sideswiping accidents tend to increase on some expressways. Should vehicles stop and exchange references to the delay of all others? The use of closed circuit television for scanning the freeway is one application of recent electronic development in traffic control. Other types of detection such as radar are also being tried. Here is a whole new field for study and action which will challenge your ingenuity."

In the formal meeting, section members decided that: (1) name badges be made available to all members; (2) nominations for 1957 officers would be presented by March 15th; (3) a tri-state meeting involving Michigan, Ohio and Indiana should be scheduled; (4) the new Ohio State Highway Director, Mr. Charles Noble, be welcomed to the state and assured of the Ohio

(Continued on page 343)



REFLECTORIZED CUTOUT LETTERS IN SIZES FROM 4" TO 30"

for simplified sign construction

Latest additions to the complete alphabets of STIMSONITE letters now give you letter height selections ranging from 4" to 30" (in capital letters), and a wide variety of upper and lower case alphabets. These weatherproof individual letters are embossed, durably finished and preassembled with brilliant STIMSONITE reflectors for superb legibility, day and night.

Individual, detachable letters, digits, border strips and symbols make it an easy job to lay out signs on the spot, to fill a wide range of requirements without costly production equipment. Field repairs and maintenance are practically nil. And, individual letters are easily removed and reused for temporary signing.

2 FREE INFORMATIVE NEW BULLETINS

For detailed information on STIMSONITE cutout letters and their use, ask for bulletin S-4D, 'Sign Messages', and S-4C, 'Spacing and Letter Width Tabulation'. Address Dept. S1-61.

STIMSONITE *for* — *Seeability* / *Readability* / *Durability*

AGA DIVISION

ELASTIC STOP NUT CORPORATION OF AMERICA

1027 NEWARK AVENUE, ELIZABETH 3, NEW JERSEY

Yearbook Changes

AVINS, Nathan, (Member)
Assistant Director, Bureau of Traffic Services, Department of Traffic. SEND MAIL: 55 East Mosholu Parkway, North,, New York 67, New York.

BASARAN, Suat (Junior)
Director, Refinery Safety Division, Rafineri Emnuyet Muduru, Petrol, Batman, Turkey.

BATTS, Herman M., Jr. (Associate)
Traffic Engineer, City. SEND MAIL: 50 N. E. 27th Drive, Fort Lauderdale, Florida.

BAUERLE, Harold G. (Member)
Traffic Engineer, Michigan State Highway Department. SEND MAIL: 212 North Hayford Avenue, Lansing 12, Mich.

BECK, Edwin L. (Junior)
Assistant Traffic Engineer, Palmer & Baker, Inc., P. O. Box 10,096, New Orleans 21, Louisiana.

CLAIRE, William H. (Associate)
Assistant Executive Director, Community Redevelopment Agency, Los Angeles. SEND MAIL: 44 East Altadena Drive, Altadena, California

DEC, Theodore (Associate)
District Planning Engineer, U. S. Bureau of Public Roads, 408 State Highway Building, Salem, Oregon.

FENNELL, Daniel L. (Affiliate)
Vice President, Kansas City Public Service Company, 1627 Main Street, Kansas City 8, Missouri.

FLEMING, Walter K. (Associate)
Manager, Virginia Transit Company, P. O. Box 1635, Richmond 13, Virginia.

GALLAGHER, John L., Jr. (Associate)
Assistant Traffic Engineer, Division of Traffic Regulation & Engineering, Crane Building, 67 North Front Street, Columbus 15, Ohio.

HANSON, Clarence W. (Associate)
Partner, Modjeski & Masters. SEND MAIL: P. O. Box 167, Harrisburg, Pennsylvania.

HOLMES, Edward H. (Associate)
Assistant Commissioner, Office of Research, Bureau of Public Roads, 18th & F Streets N.W., Washington 25, D.C.

KERMIT, Mark L. (Associate)
Traffic Engineer, Contra Costa County, Hall of Records, Martinez, California.

KISSELEFF, Louis G. (Junior)
Associate Traffic Engineer, Department of Public Works, City & County of Denver. SEND MAIL: 1155 South Fairfax Street, Denver 22, Colorado.

MacDONALD, Bruce B. (Associate)
c/o Roy E. Pratt, Consulting Engineer, 80 South Central Avenue, Springville, New York.

MARVEL, Dale D. (Associate)
Traffic Engineer, Texas Highway Department. SEND MAIL: 8722 Cedardale Lane, Houston, Texas.

McDONALD, John W. (Associate)
Highway Enginee., Automobile Club of Southern California, 2601 South Figueroa Street, Los Angeles 7, California.

McLEAN, Charles H. (Junior)
Traffic Engineer, George Barton & Associates, 600 Davis Street, Evanston, Illinois.

McLEAN, Mrs. Charles H. (Junior)
Traffic Engineer, Bureau of Street Traffic & Parking, 320 North Clark Street, Room 306, Chicago, Illinois.

MERRIAM, Lucius A. (Member)
President, Merriam Concrete Products, Inc., Williams Street, Athens, Tennessee.

MEYER, James W. (Associate)
Traffic Engineer, DeLeuw, Cather & Company, 1256 Market Street, San Francisco 2, California.

MLADINOV, John K. (Associate)
Associate Planning Engineer, Washington Department of Highways. SEND MAIL: 127 West 17th Avenue, Olympia, Washington.

NOERR, Karl (Junior)
District Traffic Engineer, Virginia Department of Highways. SEND MAIL: 318 West Spring Street, Culpepper, Virginia.

PAIGE, Clayton W. (Member)
City Engineer & Street Superintendent, City Hall, 275 East Olive Avenue, Burbank, California.

POWILLS, Michael A., Jr. (Junior)
Traffic Engineer, George Barton & Associates, 600 Davis Street, Evanson, Illinois.

ROBINSON, W. L. (Affiliate)
Associate Director, Traffic Engineering & Safety Department, American Automobile Association, 1712 G Street N.W., Washington 6, D.C.

RYKKEN, Kermit B. (Associate)
Special Assistant to the Executive Vice-President, American Automobile Association, 1712 G Street N.W., Washington 6, D.C.

SANSOM, Frederick J. (Associate)
Traffic Engineer II, Metropolitan Traffic Engineering Department, 171 Eglington Avenue East, Toronto 12, Ontario, Canada.

SHUFFLEBARGER, Curtis L., Jr. (Junior)
Highway Transport Research Engineer, U. S. Bureau of Public Roads, Washington, D.C. SEND MAIL: 414 Bainbridge Road, Alexandria, Virginia.

SINGER, Russell E. (Affiliate)
Executive Vice President, American Automobile Association, 1712 G Street N.W., Washington 6, D.C.

SKILES, Gerald W. (Associate)
Senior Traffic Engineer, Department of Traffic, Los Angeles. SEND MAIL: 3950 Hayvenhurst Avenue, Encino, California.

TSIKANIS, John C. (Junior)
Assistant Traffic Engineer, 259 Civic Center, San Diego 1 California.

RESPECTED!
OBEYED!
SAFE-T-CONE*
*U.S. Pat. Number 2,719,505
ALL-RUBBER
TRAFFIC GUIDES
The silent workhorse of efficient traffic control!
NOW IN 3 SIZES! 12", 18", 28"
SPECIAL ADAPTERS increase uses!
• SIGNS
• FLASHERS
• FLAG ADAPTERS
SLOW
DANGER
PAINTED or REFLECTORIZED
Low cost, long life, lightweight make SAFE-T-CONES ideal for every traffic control need. Tough and strong, they're made to last, even with the most abusive use.
FLASHER LIGHTS!
Uses standard 6-volt battery. Fits into top of all sizes. Unbreakable plastic lens.
2167
Write for complete descriptive folder.
Made only by RADIATOR SPECIALTY CO., Charlotte, N. C.

VANDERSTEMPEL, Theodore M. (Member)
City Traffic Engineer, City Hall, 35 South Parke Street, Pontiac, Michigan.

WATERS, Charles R. (Member)
Associate, DeLeuw, Cather & Brill, 220 Delaware Avenue, Buffalo 2, New York.

Membership Applications

The following applications have been received since the list published in the March issue.

APPLICATIONS FOR TRANSFER

BAYLEY, John M.
Traffic Engineer, Melbourne City Council, Town Hall, Melbourne, Australia. February 11, 1957 for ASSOCIATE grade.

QUIMBY, Warren S.
Highway Planning Engineer, The Port of New York Authority, 111 Eighth Avenue, New York 11, New York. February 15, 1957 for MEMBER grade.

NEW APPLICATIONS

ASTRUE, Charles J., Jr.
Senior Transportation Engineer, California Public Utilities Commission, State Building, Civic Center, San Francisco, California. February 19, 1957 for MEMBER grade.

CARLSON, Richard J.
Assistant Traffic Engineer, Seattle Engineering Department, City & County Building, Seattle, Washington. February 28, 1957 for JUNIOR grade.

DANIEL, Arthur R., Jr.
Acting Traffic Engineer, Ohio Department of Highways, Box 297, Muskingum Drive, Marietta, Ohio. February 20, 1957 for JUNIOR grade.

HUPPERT, William W.
Chief Product Engineer, Eagle Signal Corporation, 202 20th Street, Moline, Illinois. February 23, 1957 for ASSOCIATE grade.

INGRAM, William McGee
Associate, W. F. Babcock, 2824½ Bedford Avenue, Raleigh, North Carolina. February 11, 1957 for JUNIOR grade.

ROSEN, Nils T. I.
Secretary, National Committee of Research, Planning & Administration of Parking, Royal Board of Building, Hantverkargatan 29, Stockholm 8, Sweden. February 28, 1957 for ASSOCIATE grade.

SHREVE, Frank T.
Assistant Traffic Engineer, Contra Costa County Public Works Dept., Martinez, California. February 11, 1957 for JUNIOR grade.

It pays to

"CONCENTRATE" FOR ECONOMY

...with SINGLE and DUBL-DUALS

It's easy to see why DUBL-DUALS are the "fair-haired" meters in town after town.

First, installation requirements are practically cut in half!

Secondly, combined with a few SINGLE Duals, they'll meet *any* spacing requirement.

Finally, and mighty important too, each DUBL-DUAL has two completely independent mechanisms, identical and *interchangeable* with the SINGLE Dual mechanisms that have never been equalled for quality, performance and life!

For helpful, informative bulletins on SINGLE or DUBL-DUALS, for on-street or off-street parking, write today to *The Dual Parking Meter Company* (Subsidiary of Rockwell Manufacturing Company), *Canton 2, Ohio*

For extra value get **DUAL**

PARKING METERS

(Continued from page 331)

Architectural Firm Wins National Award

A long range, 15-year plan for rehabilitating a major American city has received a national architectural award.

The 4th Annual Design Award program of *Progressive Architecture* magazine cited the architectural firm of Victor Gruen & Associates for its downtown redevelopment plan for Fort Worth, Texas. The award citation also named Edgardo Contini, partner in charge of the project and Ben S. Southland, chief of planning. Of the 25 design awards and citations presented, the Fort Worth plan was the only one in the planning category. The First Design Award went to the architectural firm of Curtis & Davis for the design of a high school in New Orleans.

The Gruen organization's plan, which was developed for the Greater Fort Worth Planning Committee, would make the city's 300-acre downtown area a pedestrian center. It proposes a ban on all motor traffic in the downtown district; transformation of existing streets into shopping malls, plazas and parks; a belt ringing the central business district to supplement the primary and secondary road system; parking garages spotted at intervals along the belt road from which it is only a two and one-half minute walk to the downtown core; and an underground truck tunnel for deliveries.

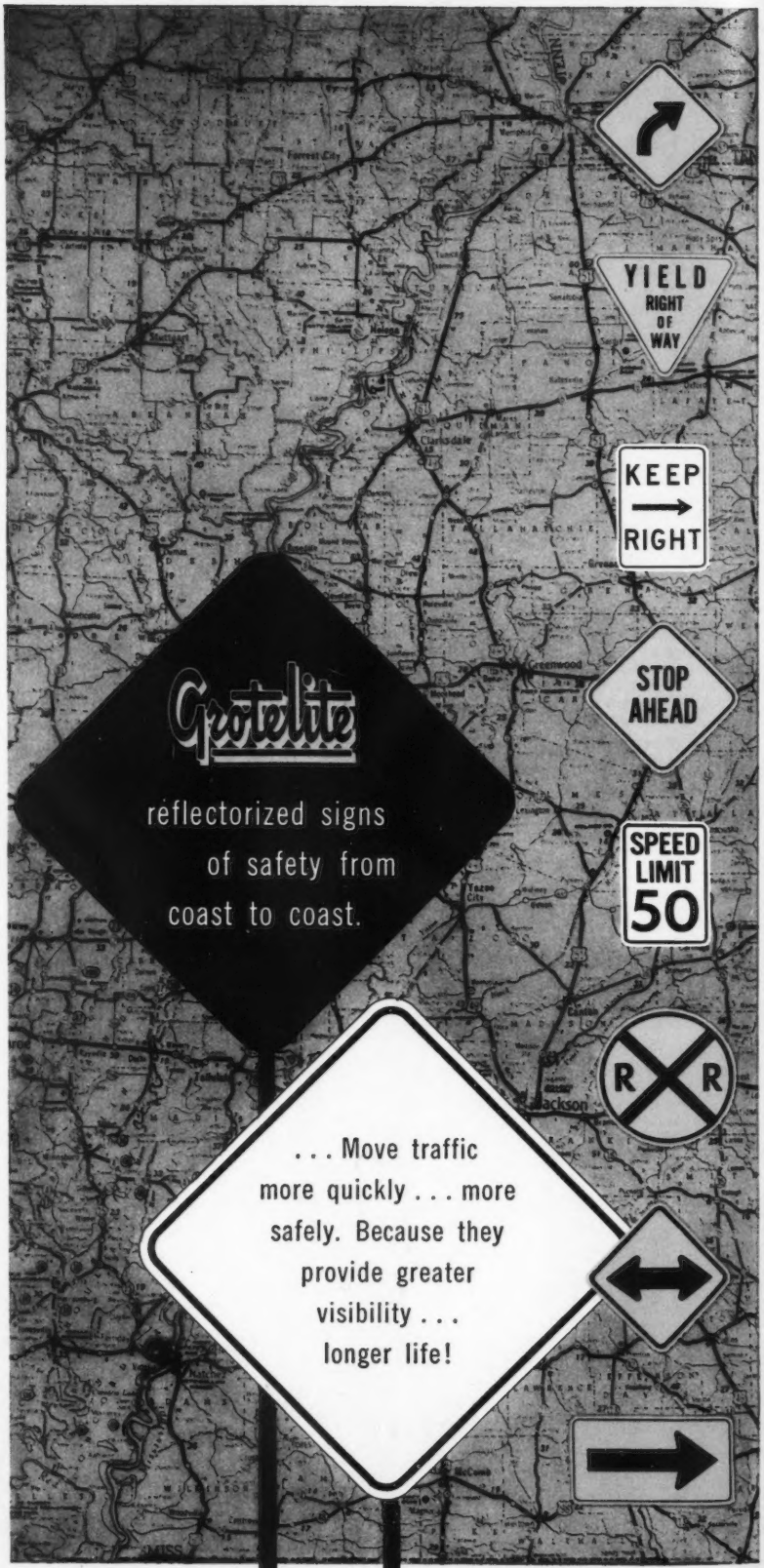
Interstate System to Add 1,000 Miles

Indications are that the additional 1,000 miles of Interstate System authorized by the Federal-Aid Highway Act of 1956 will be selected and designated by the Department of Commerce within the next two months.

Secretary of Commerce Sinclair Weeks, in a recent letter to Senator Allott (R., Colo.), wrote:

"I think that in approximately two months the 1,000 miles (of additional Interstate System) will be designated."

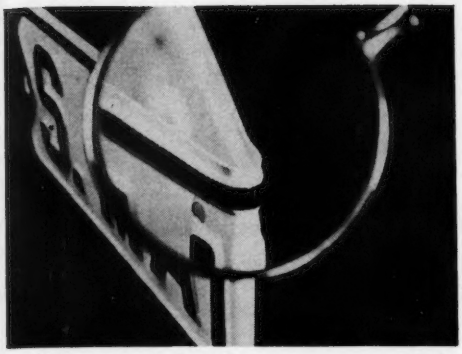
There has been considerable interest in the designation of the additional 1,000 miles—which increased the Interstate System from 40,000 to 41,000 miles—since the Commerce Department has received requests from the various states for extra mileage in excess of 12,000 miles.



Manufactured by

The Grote Manufacturing Co., Inc. Bellevue, Ky.

Manufacturers of a complete line of reflective materials and reflectorized and enameled signs.



In the demonstration above, you see an unretouched photo of a Lyle Sign bent 160 degrees. By magnification, you see that the resilient enamel baked on by Lyle shows no cracking or marring whatsoever!

ANOTHER PROOF OF LYLE'S SIGN QUALITY

Torture test shows how Lyle sign finishes resist fractures in extreme bending.

All outdoor signs are exposed to abuse. That's why Lyle Sign Engineers demand—and get—perfection in the baked enamel finish on Lyle Signs. In the most modern, electronically controlled ovens, Lyle Signs are baked at *exact* temperatures for *precise* periods of time. And, of course, Lyle Signs are clad only in the finest baking enamels available.

So, when you buy Lyle Signs, you know you are getting the best.

Write today for your personal copy of the fully illustrated, B-55, 36 page Lyle Sign Manual.

LYLE SIGNS, INC.
2720 University Avenue, S. E.
Minneapolis 14, Minnesota

Lyle

Backed by over 40 years of sign manufacturing experience.

SECTION NEWS

(Continued from page 338)

Section's cooperation; (5) a headquarters room at the national convention be considered; (6) the legislative committee would check pending legislation and inform members on matters of interest to the Ohio Section.

Mr. George Howie, member of the National Board of Directors, discussed the last Board meeting and indicated that a National Board meeting might be held in Ohio in the future.

MIDWEST SECTION

Elizabeth McLean, Chairman,
Publications Committee

The Midwest Section of ITE inaugurated its social season and new section officers simultaneously on February 2nd in Chicago. Over 100, including ITE'ers and their wives attended the 7th Annual Ladies Night dinner dance presided over by Toastmaster *Les Sorenson.* Outgoing President *Ralph Michel* turned over the gavel and presidential responsibilities to *George Hagenauer.* Other section officers are *John Zimmerman,* vice president and *Al Forde,* Secretary. Board members are *Gordon Lindquist, Wayne Volk, Ralph Michel* and *Charles Michalski.*

One hundred and ten delegates attended the ninth annual Traffic Conference at the University of Illinois on February 28th and March 1st. National ITE president *Carl McMonagle* was a featured speaker. Other speakers included *Les Sorenson, Matt Sielski, Art Dierstein, John Baerwald* and *John Hartley.*

Of technical interest: the Traffic Engineering Division of the Chicago Area Transportation Study, under the direction of *Wilson Campbell* and *Jerry Keefer,* announced the undertaking of an intersectional capacity study. Field observations were made at over 100 fixed-time signal controlled, intersections at grade in the city of Chicago. Analysis is being done by multiple linear correlation to obtain an estimating equation which can be used to predict intersection capacity—given the five to ten most important variables.

Chatter

Dave O'Connor left the Illinois Division of Highway on Feb. 1. He has gone to the land of dairies to assist *Wayne Volk* in Madison. It is rumored that Dave has taken an option on a couple of acres and is presently studying ramifications of the Soil Bank Plan.

Harry Harrison is presently touring the south and southwest in his brand new Lawrence Welk Special. His ultimate destination is Monterey, Mexico where he will inspect one of *Larry Kane's* new burro-actuated signal installations.

Jerry Cope was recently released from a short stay in the hospital. After seeing him in Champaign we are happy to report that he is hale and hearty.

George Kloac is the proud father of another boy. That makes four! (Going to try for a basketball team?)

Danny Hanson keeps that trim figure by refereeing basketball games. He is presently angling for a spot on Channel 11's proposed telecasts of the U. of C.'s Sociology Department home games.

The stork and *Bill Bauch's* building contractor are presently in a race to see who'll finish the job first.

Mike Powills and *Marty Blachman* report that their firm has left the stable for a new downtown office in Evanston. This is another sign of progress in our outlook on transportation, we suppose. Any day now we expect to see someone suggest tearing down the Wells-Fargo building since its useful days appear to be past.

Speaking of moves, the Traffic Sub-Committee, through the combined efforts of *George Hagenauer* and *Bob Zralek,* is now permanently quartered in Locker No. 607 of the Reid-Murdock cold storage plant. (Presently called the City Central Office Building.) Incidentally, the term quartered is used to signify housed, rather than "drawn and quartered" as some wags have suggested.

Professional Service Directory

DE LEUW, CATHER & COMPANY
CONSULTING ENGINEERS

Public Transit — Subways
Traffic & Parking — Railroad Facilities
Expressways — Industrial Plants
Grade Separations — Municipal Works
Urban Renewal — Port Development

150 North Wacker Drive, Chicago 6
San Francisco Toronto Oklahoma City

TRAFFIC ENGINEERING — HIGHWAY PLANNING

BRUCE CAMPBELL & ASSOCIATES
ENGINEERS

177 MILK STREET • BOSTON 9

PARKING — AIRPORTS — SHOPPING CENTERS

ALFRED KAEHRLE ASSOCIATES
CONSULTING ENGINEERS

Highway Planning — Highway Design
Traffic Engineering Surveys
Parking Studies — Shopping Centers

10 North Main Street
West Hartford 7 Connecticut

YOUR CARD
could be set in this space at a very reasonable rate.

If interested, please write
TRAFFIC ENGINEERING • 2029 K Street NW • Washington 6, D.C.

Reference Notes

Signal Cabinet Color Affects Interior Temperature

Reported by Norman C. Barnett, (Assoc. Mem., ITE), Palmer & Baker, New Orleans, La. (formerly City Traffic Engineer, Tulsa, Okla.).

Prior to initiating a repainting program on traffic signal heads, poles, and cabinets, the Traffic Engineering Department of Tulsa, Oklahoma, undertook a study of the effect of different cabinet colors (dark green, highway yellow, and aluminum) on the interior temperature of the cabinet. The study was made from June 19th through August 20, 1956. There was no shade or building near the cabinet. Maximum temperature recording thermometers were used. The results are summarized below:

Average Maximum	Cabinet Color		
Temperature of Cabinet	Green	Yellow	Aluminum
Interior	118.5°	114.9°	104.9°
Exterior	95.7°	99.7°	95.2°
Average Difference Interior to Exterior	22.8°	15.2°	9.7°

Index to Advertisers

A'G'A Division of Elastic Stop Nut Corporation 339
Automatic Signal Division of Eastern Industries, Inc. 308
Cataphote Corporation 347
Duncan Parking Meter Corporation 306
Eagle Signal Corporation 337
Flex-O-Lite Manufacturing Corporation 312
Grote Manufacturing Company, Inc. 342
Kaiser Aluminum and Chemical Corporation 307
Lyle Signs, Incorporated 343
Minnesota Mining & Manufacturing Company 327
Prismo Safety Corporation ..... Back Cover
Radiator Specialty Company 340
Robbins Tire & Rubber Company 310
Rockwell Manufacturing Company 341
St. Paul & Tacoma Lumber Company 335
Streeter-Amet Company 323

Professional Service Directory

EDWARDS, KELCEY and BECK
CONSULTING ENGINEERS

Surveys — Reports — Economic Studies — Design — Supervision
Transportation — Traffic — Parking — Terminals — Port and Harbor Works
Highways — Expressways — Grade Separations — Tunnels
Bridges — Water Supply — Management

3 William Street, Newark 2, N. J. • **250 Park Avenue, New York 17, N. Y.**

PARSONS, BRINCKERHOFF HALL & MACDONALD
Engineers

Bridges, Highways, Tunnels, Airports, Subways, Harbor Works, Dams, Canals, Traffic, Parking and Transportation Reports, Power, Industrial Buildings, Housing, Sewerage and Water Supply.

51 Broadway **New York 6, N. Y.**

THE H. K. FERGUSON COMPANY
ENGINEERS AND BUILDERS
PARKING AND TRAFFIC SURVEYS • ECONOMIC STUDIES
GARAGE DESIGN AND CONSTRUCTION

New York - Cleveland - Cincinnati - Chicago - Atlanta
Los Angeles - San Francisco - Toronto - London

HARDESTY & HANOVER
CONSULTING ENGINEERS
BRIDGES — Long Spans of All Types
Movable — Lift, Bascule & Swing
Hanover Skew Bascule
Grade Crossing Eliminations
Other Structures Foundations
Expressways and Thruways
Design — Supervision — Inspection
Valuation — Reports
101 Park Avenue **New York 17, N. Y.**

PALMER AND BAKER, INC.
CONSULTING ENGINEERS — ARCHITECTS
Surveys — Reports — Design — Supervision — Consultation
Transportation and Traffic Problems Tunnels Bridges Highways Airports
Industrial Buildings Waterfront and Harbor Structures
Graving and Floating Dry Docks
Complete Soils, Materials and Chemical Laboratories
Mobile, Ala. **New Orleans, La.** **Harvey, La.**

S. Herbert Taylor Frank J. Sleeper
David L. Taylor William H. Taylor

SHERMAN, TAYLOR & SLEEPER
CONSULTING ENGINEERS
501 Cooper Street, Camden 2, N. J.
EMerson 5-0555
Park & Norwod Aves., Pennsauken 8, N. J.
MErchantville 8-4848

GANNETT FLEMING CORDDRY and CARPENTER, INC.
- - - ENGINEERS - - -
CONSULTING SERVICE FOR TRAFFIC, PARKING and TRANSPORTATION PROBLEMS
City Planning — Highways — Bridges — Flood Control
Water Supply — Sewerage— Industrial Waste — Garbage Disposal
Appraisals — Investigations — Management
600 NO. 2nd STREET HARRISBURG, PA.
Pittsburgh, Pa. Philadelphia, Pa. Daytona Beach, Fla. Medellin, Colombia, S. A.

JENKINS, MERCHANT & NANKIVIL
Consulting Engineers
Municipal Improvements Sewerage
Power Development Water Systems
Traffic Surveys Industrial Plants
Flood Control Recreational Facilities
Airports Investigations and Reports
805 East Miller Street
Springfield, Illinois

TRANSPORTATION PROBLEMS
HIGHWAYS
THE CLARKESON ENGINEERING COMPANY
INCORPORATED
285 Columbus Ave., Boston 16, Mass.
COmmonwealth 6-7720
EXPRESSWAYS **AIRPORTS**

Highway Traffic Engineers, Inc.
345 Boylston Street
Brookline 46, Massachusetts
LOngwood 6-0275

TIPPETTS — ABBETT McCARTHY — STRATTON
Engineers
Traffic, Parking and Transportation
Surveys, Economic Studies and Financial Reports
Highways, Subways, Bridges, Tunnels—Airports, Ports, Harbors, Power Developments, Water Supply, Sewerage
Planning, Reports, Design, Supervision of Construction
62 West 47th St. 110 Market St.
New York 36, N.Y. San Francisco, Cal.

Institute Affairs

Life Insurance Trustees Meet

The five Trustees appointed under terms of the Insurance Trust of the Institute of Traffic Engineers met in Washington late in February. The group, which includes Burton W. Marsh, D. Grant Mickle, Charles W. Prisk, Edward G. Wetzel, and Executive Secretary David M. Baldwin, elected Mr. Prisk as Chairman of the Trustees and named Baldwin as Secretary-Treasurer.

The Trustees reviewed in detail the Trust Agreement and current plans for solicitation during the enrollment period, which began February 15 and ends April 15, 1957. General approval was given these activities, and authority was specifically voted for the Secretary-Treasurer to open a bank account in the name of the Trustees, delegate administrative and clerical duties in connection with the insurance plan, and otherwise put the machinery of the Trust into operation.

ASCE Membership of ITE Members Studied

At the request of a special committee of the American Society of Civil Engineers, under the chairmanship of ITE-member Wilbur Smith, a questionnaire was directed late in 1956 to all Institute members inquiring about ASCE membership. Approximately 1020 questionnaires were sent out, with 535 returned. Of those responding, 39 per cent reported ASCE membership. This represents about 20 per cent of all Institute members. Two-thirds of those ASCE members, as well as two-thirds of the responders who do not belong to ASCE, reported that "Civil Engineering" magazine was read regularly or occasionally, and 40 per cent of all responders indicated regular or occasional participation in local engineering group activities other than local sections of ITE.

Of particular interest were the reasons given for belonging or not belonging to ASCE. The most frequently mentioned reason for belonging to ASCE was that of professional identification. Many said "I am a civil engineer and this is my professional society." Other reasons given included publications, contacts and prestige.

Many reasons were given for not belonging to ASCE. About 10 per cent reported that they were not eligible, and another 10 per cent said they were not interested. Nearly 20 per cent said they were too busy to take part in any other outside group activity, and 7 per cent said that the cost of ASCE membership was a deterrent. One of the most frequently mentioned reasons was that ASCE had nothing to offer the traffic engineer.

Results of this study have been made available to the ASCE committee, which hopes to develop more ASCE activities of interest to traffic engineers, thereby bringing traffic engineering to the attention of more civil engineers and increasing the stature of the traffic engineering profession.

Past Presidents' Award Competition Still Open

All Junior and Associate members under 35 years of age are reminded by Chairman Prisk, of the Past Presidents' Award Committee, that competition for the 1957 award does not close until July 23.

The achievement may have been previously reported, but if so it must have been published within three years of the closing date of the competition. Each applicant is limited to one entry and must furnish evidence that he was responsible for a substantial part of the conception, direction and interpretation of the work.

The committee has expressed the hope that a large number of entries would be received this year and has asked all members of the Institute to encourage eligible members to submit entries.

Local Sections Meet

While many local sections meet regularly, as is true of the Metropolitan New York Section, the Midwest Section, the Washington (D.C.) Section and some others, this is not true of all sections. The Canadian Section, the Western Section, the Texas Section, the Southern Section and others are so widely distributed that annual or semi-annual meetings are the rule.

The Southern Section held its 1957 meeting in Richmond early in March in connection with the Southern Safety Conference. The meeting was well attended, and an interesting program was presented in connection with the Conference. New officers for 1957 include W. H. Mann, President; Fenton G. Jordan, Jr., Vice President; and John T. Hanna, re-elected Secretary-Treasurer.

The Texas Section met earlier in the year, naming James S. Saylor as President, W. H. Carsten as Vice President, and William C. Brandes as Secretary-Treasurer. The Section will meet again in Houston on June 7 and 8, when it will play host to the Board of Direction.

The Western Section is planning a meeting in Denver June 25 to 27. Other annual or semi-annual meetings will be reported in the pages of the magazine if and when advance information is furnished the headquarters office.

1956 Proceedings Issued

The Proceedings of the 1956 Annual Meeting in San Francisco have been published and were mailed to all members the middle of March. If you have not yet received your copy, please advise the headquarters office and another copy will be sent you.

The 136-page booklet contains all major addresses presented at the San Francisco meeting, as well as a report on the annual business meeting, copies of resolutions adopted and pictures of new officers.

Additional copies are available at $2.00. Orders should be directed to the headquarters office.

Yearbook

Publication of the 1957 Yearbook has been delayed. This book was expected early in January, and the printer had copy in time for early publication. Due to a number of circumstances beyond our control, however, the actual printing has been pushed back. The volume should be ready soon, and actually may be in the mail by the time this is read.

WHEN YOU CHANGE YOUR ADDRESS

. . . please notify us promptly. Your copies of "TRAFFIC ENGINEERING" will then reach you without delay and without interruption.

Show them the way to SAFETY with CATAPHOTE SIGNS

Signs that work part-time . . . signs that are visible only during the daylight hours and hide in the blackness of night . . . these are factors that contribute to traffic fatalities.

Mark streets and highways with Cataphote Reflective Signs and night driving becomes safer . . . more pleasurable. Feel the comforting sense of safety as the first headlight beam touches the Cataphote Sign, instantly revealing the nature of the hazard ahead.

To make streets and highways safer . . . to provide 'round-the-clock protection . . . turn to signs that tell their story by *daylight and darkness.* Turn to Cataphote . . . manufacturers of a full line of non-electric traffic control products, all backed by almost 30 years of specialized experience and research. Rely on Cataphote to show them the way to safety.

Cataphote CORPORATION

TOLEDO 10, OHIO / JACKSON, MISSISSIPPI

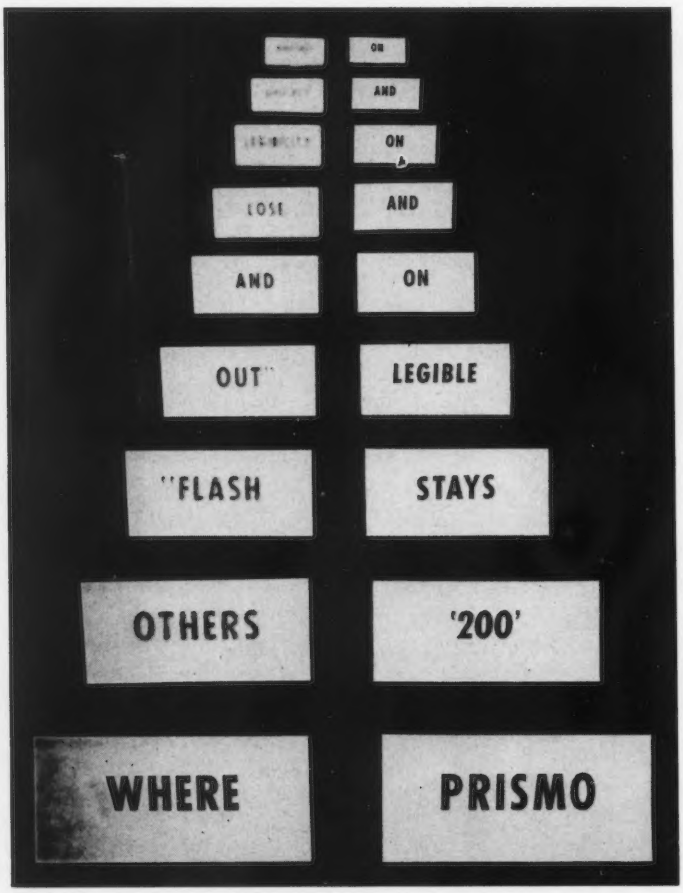
CATAPHOTE TRAFFIC CONTROL PRODUCTS:

STREET SIGNS • TRAFFIC SIGNS • REFLECTIVE FINISH • REFLECTIVE BEADS • REFLECTOR BUTTONS REFLECTIVE STRIPING • HOT PLASTIC STRIPING

PRISMO '200'

Hi-REFLECTIVE FINISH

You know the name... Now see the difference!



PRISMO—the first name in reflective traffic marking materials—now offers the revolutionary new and different Prismo '200' Hi-Reflective Finish for warning, guide and regulatory signs . . . gives a uniform coating to porous and non-porous surfaces alike . . . applied by any type applicator to signs of any size, shape or form . . . without a bit of waste. Prismo '200' becomes an integral part of the sign, cannot peel, blister or smudge . . . goes on fast, and lasts and lasts.

Signs reflectorized with Prismo '200' have maximum long-range punch . . . with long and close range legibility, achieved through Prismo's unique non-glare reflectivity. Full 180° angularity and exclusive moisture proofing are added features that make Prismo '200' the ideal reflective material for all types of highway signs.

Many Sign Shops can cut their reflectorizing costs more than 50% by adopting PRISMO '200' . . . Find out all about Prismo '200' . . . send for bulletin P256 today.

The SPHERE of SAFETY

PRISMO

PRISMO SAFETY CORPORATION • HUNTINGDON, PA.

PA.